REPORT RESUMES

ED 012 707 SP 001 200

TEACHER PERSONALITY, TEACHER BEHAVIOR AND THEIR EFFECTS UPON PUPIL ACHIEVEMENT. FINAL REPORT.

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PUB DATE APR 67
CONTRACT OE-6-10-271
EDRS PRICE MF-$0.75 HC-$6.24 156P.

DESCRIPTORS- *ACADEMIC ACHIEVEMENT, ACHIVEMENT TESTS, ARITHMETIC, BEHAVIOR RATING SCALES, BIBLIOGRAPHIES, LESSON OBSERVATION CRITERIA, *PERSONALITY, READING COMPREHENSION, STATISTICAL ANALYSIS, *TEACHER CHARACTERISTICS, *TEACHER INFLUENCE, VOCABULARY DEVELOPMENT, TEACHER OBSERVATION PERSONALITY SCHEDULE, EDWARDS PERSONAL PREFERENCE SCHEDULE, SCIENCE RESEARCH ASSOCIATES TESTS, ALBUQUERQUE

SIXTY URBAN, MIDDLE-CLASS, FOURTH-GRADE TEACHERS IN THE SOUTHWEST WERE GIVEN THE EDWARDS PERSONAL PREFERENCE SCHEDULE (EPPS) AS A MEASURE OF PERSONALITY. THEIR CLASSROOM BEHAVIOR WAS THEN RECORDED ON A TEACHER OBSERVATION PERSONALITY SCHEDULE REFLECTING EDWARDS' DEFINITIONS OF HIS NEEDS FOR ACHIEVEMENT, ABASEMENT, AFFILIATION, DOMINANCE, CHANGE, ORDERLINESS, AND HETEROSEXUALITY. PUPILS' ACHIVEMENT WAS MEASURED AS THEIR ADJUSTED GAIN SCORES BETWEEN FALL AND SPRING TESTING ON FIVE SUBTESTS OF THE SCIENCE RESEARCH ASSOCIATES ACHIEVEMENT TESTS--ARITHMETIC REASONING, ARITHMETIC CONCEPTS, ARITHMETIC COMPUTATION, READING COMPREHENSION, AND READING VOCABULARY. CANONICAL ANALYSIS OF THE THREE SETS OF DATA SHOWED RELATIONSHIPS BETWEEN THEM. IT WAS FOUND THAT (1) NO SINGLE TEACHER BEHAVIOR WAS DETRIMENTAL OR FAVORABLE FOR ALL LEARNING, (2) THE EPPS SCORES ESTABLISHED A BASIS FOR PREDICTING TEACHERS' OBSERVED CLASSROOM BEHAVIOR, (3) THE PATTERN OF PREDICTED BEHAVIORS DID NOT CLOSELY FOLLOW THAT REVEALED AS CONTRIBUTING TO PUPIL GAINS, (4) FROM EPPS, THE MORE EFFECTIVE TEACHERS (IN TERMS OF PUPIL GAINS) MAY BE DESCRIBED AS CRITICAL, WILLING TO ACCEPT LEADERSHIP, AND INTERESTED IN PERSUADING AND INFLUENCING OTHERS. IT WAS CONCLUDED THAT THE PARADIGM "TEACHER PERSONALITY CAUSES TEACHER TEACHER BEHAVIOR CAUSES PUPIL BEHAVIOR" WAS SUPPORTED, BUT THAT THE LINKAGES ARE COMPLEX, AND NOT 1 TO 1. (LC)

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THE UNIVERSITY OF NEW MEXICO

College of Education

Department of Educational and Administrative Services

Final Report

for

Teacher Personality, Teacher Behavior and Their Effects Upon Pupil Achievement

by

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and

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April, 1967

The research reported herein, was supported by a Faculty Small Grant under the provisions for Basic and Applied Research, Public Law 531, as implemented by the Research Branch, Office of Education, Department of Health, Education and Welfare, Contract OE-6-10-271.

PREFACE

"Despite the critical importance of the problem and a half-century of prodigious research effort, very little is known for certain about the nature and measurement of teacher personality, or about the relation between teacher personality and teaching effectiveness." (Getzels, 1955).

Classroom observation on teaching effectiveness has been carried on since the beginnings of organized research on educational climate. The information reported in this document is a consequence of classroom observation on teaching effectiveness carried on from September, 1966, to the termination of the project in April, 1967.

In the past, attempts to validate an observational instrument for the measurement of teacher behavior have been unsuccessful. The present research is the result of an attempt to validate an observational instrument for the measurement of teacher traits, the salient objective being, to find the relationships between teacher personality, teacher behavior and pupil gain.

It is the authors' sincere hope that, at least, some of our colleagues in the field of education will find the following information useful. We fully realize that, "What is needed is not research leading to the reiteration of the self-evident but to the discovery of specific and distinctive features of teacher personality and of the effective teacher." (Getzels, 1955).

ACKNOWLEDGEMENTS

The completion of this research was made possible by the personal contributions of a patient and gracious group of educators -- the classroom teachers who repeatedly allowed us to invade their classrooms, participated in our testing program and generously responded to our many requests for information. We wish to express our sincere gratitude to them, to their pupils and to their principals.

Many of the underlying concepts as well as methods for setting up the study were due to the participation of Dr. Harold Drummond of The University of New Mexico, and had it not been for the continued interest and concern of Fred Nelson, Assistant Superintendent for Albuquerque's programs in elementary education, the project could not have gotten off the ground.

We are especially indebted to Isabelle Cummings and Marilyn Irion for their confidence in the worthiness of this attempt and for their discretion as classroom observers throughout this project.

A distinguished team of programmers and analysts contributed to the statistical accuracy of the information reported here--Dr. Parker Fowler, Dale Sparks, Julie McEwen, Don Croft, Max Luft, John Newfield and Robin Young.

For personal support, testing information and manuscript preparation, we wish to thank Chester Travelstead, Dean of The University of New Mexico's College of Education, Bob Watson, Jean Hendrickson, Pete Echelle, Betty Hobbs, Marcella Sadilek, and Betsy Vinz.

Many other persons who contributed to the success of the project deserve our special thanks, but they are too numerous to mention individ-

ually. In preparing this manuscript, we have repeatedly imposed on many of our busy colleagues with requests for suggestions and information. To all of these ladies and gentlemen -- thank you.

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1. The Setting

The basic elements comprising the teaching/learning process have eluded researchers for many years. Medley and Mitzel (1963) have proposed that classroom learning results from the interactions of three complex sets of variables: teacher personality, teacher behavior in the classroom, and the pupils. Environmental factors (temperature, space, etc.) have also been seen as possible contributers. This research examines the relations between teacher personality, teacher classroom behavior and pupil achievement. It was hypothesized that significant relations exist between and among these three sets of variables.

For the purposes of this investigation, teacher personality was defined as a teacher's scores upon the sixteen scales of the Edwards Personal Preference Schedule (Edwards, 1959). Teacher classroom behavior was that behavior recorded by an observer using an Observation Schedule and Record (OScAR) type of observation schedule. Pupil achievement was the adjusted (or residual) gain scores between fall and spring testing upon five sub-tests of the Science Research Associates Achievement Tests, Forms C and D, Blue battery. The sub-tests were Arithmetic: Reasoning, Concepts and Computation; and Reading: Comprehension and Vocabulary (Thorpe, et al, 1964).

Significance of the Study

This study had several potential values. If certain patterns of teacher classroom behavior could be demonstrated to relate to pupil achievement (or the reverse), then we would be in a position to guide the development of that teacher behavior which leads to pupil learning. And, we can attempt to extinguish those behaviors found to interfere with

learning. These kinds of activities could take place at both the preservice and inservice levels. In other words, both teacher educators and supervisors would be able to recommend that certain behaviors be emphasized or avoided. To date, the education profession has had to operate largely upon faith or ancient wisdon; the research basis has not yet been established.

If a relationship can be established between personality scores and behavior, it is possible that certain tests or portions of tests could serve as selection devices. That is, if certain classroom behaviors are related to pupil learning, and if these behaviors can be predicted, it might be desirable to select as teachers or education students those most likely to exhibit the desired behaviors.

This research should clarify the domain of the teaching/learning process. It might be possible to trace the relations between personality, behavior and learning. This should lead, in turn, to more sophisticated efforts to dig below the surface in order to find the reasons why. In the long run, we may be able to predict, to understand and to control. And as indicated above, these kinds of predictions and understandings could have immediate and direct application to the educational scene.

At the same time, it should be stressed that this study has many limitations. In broad, it should be viewed as a pilot study, an ground-breaking effort, which would, hopefully, lead to further testable hypotheses in teaching and learning.

Backgrounds to the Study

Medley and Mitzel have provided much impetus to research in teaching which emphasizes observational techniques. And beyond this, they have conceptualized a model for the teaching/learning process. In essence, the Medley and Mitzel approach to classroom observation entails the listing of

specific teacher behaviors, e.g., "The teacher helps the pupil." The specific behaviors were drawn from their ideas and the ideas of others on the nature of teaching, of what one might reasonably expect a teacher to do. Then, instead of rating the "goodness" or "badness" of a given behavior, they simply recorded the extent to which the behavior occurred. Value judgements were not formed. The various recorded behaviors were analyzed in several ways. For one, they established the relationship between certain "supportive" behaviors and pupil judgements of classroom climate. In similar fashion, a relationship was established between teacher behavior and supervisors' evaluations (Medley and Mitzel, 1961). Unhappily, they were unable to demonstrate relationships between teacher behavior and pupil learning (Medley and Mitzel, 1963).

Flanders and his students have proceeded on a somewhat different tack. Using concepts from group dynamics, they devised an observation method stressing the interactional aspects of teacher behavior. Their system focuses upon the degree and kinds of verbal interactions between teacher and pupil. Thus, one teacher might be characterized as being the "lecturer" and another as being "group oriented." It seems fair to state that Flanders and his students have been inclined to view their system as criterion in nature; that is, teachers who emphasize lectures, directions, orders should be trained to become those who emphasize accepting, supporting and praising (Amidon and Flanders, 1963). The attempts to link these variables to pupil achievement have been limited both in scope and findings.

Gordon (1964) applied portions of the Medley-Mitzel model in an effort to relate personality variables to observed classroom behavior. His modified OScAR yielded three scores: supportive teacher behavior,

disorderly pupil behavior and emotional climate. These failed to correlate with scores from the EPPS.

Soar showed the remarkable power of a statistical tool relatively new to educational research. Canonical correlation is admirably suited to examining the complex relations between sets of predictor variables and sets of criteria variables. Before canonical correlation, we could examine only sets of predictors for a given criterion. The technique is possible only because of the availability of electronic computers. Canonical analys . permits one to include the scores from a battery of tests, in this case, the EPPS, vs. a set of criteria variables, such as the many scores obtained from an observation schedule. The two sets of variables are factored and correlation coefficients computed between the sets of factors. Further, a weight for each variable is computed so that one can determine the relative contribution made by each (Cattell, 1966; Cooley, 1962). The study reported below may help to show how this approach is managed.

Predicting Pupil Gain from Teacher Personality

According to an unpublished study by Cooper, teachers who obtained certain EPPS scores had classes that made higher or lower gains from fall-spring testing with the Stanford Achievement Tests. Forty-three elementary school teachers from the Nevada towns of Carson City and Winnemucc and Artesia, New Mexico were given the EPPS. The Stanford Achievement Test scores of their pupils were adjusted for initial knowledge and each teacher was assigned average adjusted gain scores for the subtests of Paragraph Meaning, Word Meaning, Spelling, Arithmetic Reasoning and Arithmetic Computation. The teacher's fifteen EPPS scores were canonically correlated with the five gain scores. Gain data were available for each teacher for two consecutive years, thus making it possible to replicate the study.

As noted below, the data failed to yield the same results for the two years, but several interesting hypotheses were derived.

For year I, five canonical correlations emerged. The <u>first</u> correlation was 0.74; its gain factor included Paragraph Meaning (and its weight of .62), Word Meaning (-1.05) and Spelling (.75). The EPPS scores relating to this factor were dominance (1.16), abasement (.98), orderliness (.97), change (1.14) and heterosexuality (.87). This could be interpreted to mean that teachers whose pupils showed gains in Paragraph Meaning and Spelling, but not in Word Meaning were characterized by high EPPS scores in dominance, abasement, orderliness, change and heterosexuality.

The <u>second</u> canonical correlation was 0.66 and it possessed only one element of pupil gain, that of Arithmetic Reasoning with a weight of -1.22. The EPPS scales related to this factor were achievement, change, dominance, nurturance and orderliness with weights between 2.74 and 3.09.

The <u>third</u> canonical correlation was 0.55 and included two elements of pupil gain: Paragraph Meaning (.71) and Arithmetic Reasoning (.47). Two EPPS scales were involved; change (-.93) and dominance (-.97).

The <u>fourth</u> correlation of 0.41 included Spelling (-.85) and Paragraph Meaning (.45). Four EPPS scales accounted for these gains, abasement, change, endurance and heterosexuality with weights from 1.20 to 1.55.

The <u>final</u> correlation of 0.31 included Arithmetic Computation (1.31) and the three EPPS scales of abasement, dominance and endurance with weights of between 1.31 and 1.79.

The findings from the second year provided somewhat similar results, but the loadings and factors were different. The main conclusion from these data was this: for the first time, personality test data seemed to

be related to a classroom process, namely that of pupil gain. The fact that the study failed to replicate was seen as due to the instruments and procedural difficulties. For example, the forms of the Stanford Achievement Test varied from school to school. The testing dates were quite different. But the data did suggest that here was an area well worth investigating further.

Summary

This brief review stresses the following points:

1. The teaching/learning process is best analyzed when the three major factors are concurrently considered: the teacher's personality, the teacher's classroom behavior and the pupils.
2. At least two methods for analyzing teacher classroom behavior have been devised. The Medley-Mitzel OScAR permits the inclusion of behaviors thought relevant to one's hypothetical constructs.
3. Several studies have shown that possible relationships may exist between the complex variables of teacher personality, teacher behavior and pupil gain. These studies have examined parts of the Medley-Mitzel paradigm; it still remains for research to try to relate all three aspects in a single study.
4. The statistical tool, canonical analysis, makes it possible to examine the relationships between <u>sets</u> of predictor and criteria variables. The tool can be applied when a modern electronic computer (e.g. IBM 360) is available.

2. The Design

The broad outline of the study was relatively simple: administer the Edwards Personal Preference Schedule (EPPS) to some sixty fourth grade teachers. Observe these teachers for nine periods of twenty-two and one-half minutes each during the fall of 1966. Administer to their pupils the reading and arithmetic portions of the Science Research Associates Achievement Tests (SRA) in October and again in February. These procedures provided three sets of data for each teacher: an EPPS profile, a set of observation data, and five measures of pupil gain. These three sets of variables were then examined via factor analysis or canonical correlation to test the basic hypotheses of relationships between the variables.

The Sample

The public schools of Albuquerque, New Mexico agreed to participate in the research. Its schools include not only wide socio-economic conditions, but a variety of ethnic groups: Anglo, Indian, Negro and Spanish-American pupils. For many kinds of research, these wide disparities might be very valuable. In the present instance, it was felt that effective (i.e., promoting pupil gain) teacher behavior might vary across socio-economic or ethnic groups. In order to avoid this possibility, the decision was made to limit the sample to middle class schools within the system. Further, it has been observed that pupil learning rates seem to vary across grade levels (Medley, 1961). That is, third grade pupils seem to learn at a different rate than do fifth grade pupils, etc. Also, the Albuquerque Public Schools routinely administer the SRA achievement tests to pupils in grades

four and six. There were a larger number of fourth grades than sixth grades. This factor could become important when drawing a volunteer sample. The chances were stronger for securing a sample of adequate size. The design required that at least two, and preferably three or more, teachers represent each school selected. Consequently, the study was limited to schools enrolling at least three fourth grades.

Letters were sent by the Associate Superintendent of Schools to the principals of eighteen elementary schools in the middle class sections of Albuquerque. These principals represented those thought to be most favorable toward experimentation and research. The letter explained the study's broad purposes and invited the principal to volunteer his fourth grade teachers. Acceptances were given by seventeen of the invited eighteen principals. Thus, a non-random, non-probability sample was selected. This sample affects, of course, the validity of the study, especially the external validity. The findings from this study should apply to schools which are middle to upper-middle class, which enroll mostly Anglo pupils and whose principals tend to support the research enterprise. And, they apply to fourth grade teachers of such schools.

The initial contact with the principals suggested that a sample of seventy-one fourth grade teachers was available. These teachers were asked (via their principals) to report to the University on a Saturday morning or a Monday afternoon during the first week of September. The teachers were informed that the purpose was to explain a research project which might be of interest, to take a preference test, and that they would be recompensed the sum of five dollars for their trouble. A total of sixty-one teachers responded to these blandishments; they were informed

of the broad purposes and were given the EPPS. They were assured that all findings of an individual nature would be the private property of the investigators, that no one in the schools would have access to the data and that these assurances had the support of central administration of the school system. Prior to administering the Edwards Personal Preference Schedule, the teachers were given additional information relative to the purposes of the research project. They were informed that we were trying to learn more about teachers' classroom behavior and its possible effects upon pupil learning. The observers were introduced at this time, and again, complete confidentiality was guaranteed. Due to the nature of the research project, the full details of the specific teacher behaviors of concern were not disclosed. At this time, questions from the group were answered or discussed.

Shortly after commencing the observation phase of the research, it was learned that one of the schools employed a special, homogeneous reading program. The fourth grade children were sent to teachers, not necessarily their regular ones, for an hour's reading work each day. This school was dropped from the project, because growth in reading was one of the criterion areas. This school was replaced by another. Two teachers dropped out during the observational phase, one due to pregnancy and the other because of change in employment. These shifts resulted in a net loss of one teacher; the final sample included sixty teachers of grade four, five of whom were men.

These sixty teachers taught classes averaging about thirty pupils as revealed in Table 2.1. The table shows, for example, that twenty teachers had from twenty-nine to thirty pupils, that the largest class was about thirty-seven children and the smallest was about twenty-three

children. The data analyses presented, subsequently, will be based upon somewhat smaller numbers of pupils. This was due to absence, incomplete records and the like.

TABLE 2.1

Distribution of Class Size

Number of Pupils In Class	Number of Teachers	Frequency (each x = one teacher)
37 - 38	(1)	x
35 - 36	(1)	x
33 - 34	(3)	xxx
31 - 32	(18)	xxxxx xxxxx xxxxx xxx
29 - 30	(20)	xxxxx xxxxx xxxxx xxxxx
27 - 28	(11)	xxxxx xxxxx x
25 - 26	(5)	xxxxx
23 - 24	(1)	x

N = 60 Teachers

The Observation Phase

The Teacher Observation Personality Schedule (TOPS) was prepared as described in Chapter 3. Three graduate students (MA and above), each of whom had several years elementary school teaching experience, were engaged as observers. Two were employed on a half-time basis; one was a full-time research assistant. This team, augmented by the Principal Investigator, devoted several days in September to studying the descriptions and categories of the TOPS. Certain items were redefined, edited or eliminated. Much discussion was required to gain a consensus of sorts on the exact meanings of items. After three days of exchanging ideas

and reaching agreements, the team moved into a fourth grade classroom. All four members observed the same teacher at the same time. When finished, the group repaired to the teachers' lounge to compare notes. Not surprisingly, discrepancies were noted. These were discussed and new agreements reached on the definition of terms. Another fourth grade teacher was observed and the four TOPS records compared. More readjustments. More observation. This process was continued for eight team observations, including six teachers of grade four. It should be noted in passing, that the presence of four observers, one holding a stop watch, all holding clip boards, all marking madly each time the teacher moved could have proved to be somewhat unsettling influences upon the teachers. It's a credit to the sturdiness of these teachers that they put up with this training program for as long as they did.

Interrater reliability was computed by correlating the scores of the three observers after they had, as a team, observed four teachers. The coefficients of 0.6 and above with a median of 0.8 indicated that all three were recording the behaviors under the same categories.

Following the two weeks of training, the observers were assigned to schools so that observer A visited one-half of the schools, observer B visited the other half, and observer C (the full-time assistant) visited all teachers in the study. Teachers were not informed of each visit in advance; each observation required twenty-two and one-half minutes plus the time to get settled and to depart. Usually four teachers could be observed by one observer in a morning. Absences, special programs, vacations, etc., served to reduce the actual number of observations per day and per week. All teachers were observed for a total of at least nine times by Christmas.

The Science Research Associates Achievement Tests

The SRA tests have been given in the Albuquerque schools for the past two years; both teachers and pupils can be assumed to be moderately familiar with them. The school's testing program called for the administration of these tests (the full battery) during the latter part of February, 1967. For the purposes of the project, the reading and arithmetic portions were given in October to the participating classrooms. The SRA Achievement test, Form D, Blue Level, first trimester Norms was administered in October, 1966. The SRA Achievement test, Form C, Blue Level, second trimester Norms was administered in February of the following year (Thorpe, 1964).

Five sub-tests were employed on the basis that reading and arithmetic occupy central roles in the instructional program of the elementary school. Also, school officials felt that the time demands for more than the five sub-tests would be inappropriate. The sub-tests and their content are described as follows:

Reading Comprehension

Measures pupils' ability to understand the overall theme of a a story, identify the main ideas, infer logical ideas, and retain significant details.

Reading Vocabulary

The ability to understand the meanings of words in context.

Arithmetic Reasoning

Via a story format, measures understanding of the logical and mathematical steps which lead to the solution of arithmetic problems.

Arthmetic Concepts

Assesses the pupils' ability to translate verbal problems into quantitative symbols. A measure of knowledge of the vocabulary of arithmetic.

Arithmetic Computation

The ability to apply the mechanics of computation.

Thorpe (1964) reports a range of KR 20 reliability coefficients of .84 - .92 with a median of .875 for these tests.

The teachers had been promised their class scores as soon as available, but technical difficulties (getting them scored) interfered and the scores of the pre-test were not made available to the teachers until January.

Although the full battery was given in February, only the comparable scores in reading and arithmetic were recorded for the project.

The five pre- and post-test scores made it possible to compute five "gain" scores for each teacher. This entailed computing the correlation coefficients between pre- and post-test scores for each of the five subtests. By using the overall pre-test means, the overall post-test means, the correlation coefficients and the standard deviations, it was possible to compute five predicted post-test scores for each teacher. From the predicted mean score was subtracted the teacher's actual obtained post-test mean. The difference between predicted mean and obtained mean yielded the adjusted "gain" score. For example, suppose that we have predicted Miss Jones' class would get a mean of 4.5 in Reading Comprehension. Suppose that her class actually reaches a mean of 5.0. The difference between the obtained mean and the predicted mean,

or 5.0 - 4.5 = 0.5; Miss Jones has exceeded our expectations by one-half of a year in arithmetic. Her gain score is +0.5. On the other hand, suppose that we had predicted a post-test mean of 4.8 for Mrs. Adams, but her class actually scored a mean of 4.2 in the February testing. Her gain score would be: 4.2 - 4.8 = -0.6; her class fell below our expectations.

The equations for obtaining adjusted gain scores were:

Predicted Post-Test (Spring) Mean

$$\bar{Y}'_a = \bar{Y} + r \frac{s_y}{s_x} (\bar{X}_a - \bar{X})$$

Where:

$\bar{Y}'_a$ = Any teacher's predicted post-test mean, for any one of the five variables.

$\bar{Y}$ = Mean spring score for all pupils for any one variable.

r = Correlation coefficient between fall and spring tests for any variable.

s_x = Standard deviation for the fall scores for all pupils.

s_y = Standard deviation for spring scores.

$\bar{X}$ = Mean fall score for any variable.

$\bar{X}_a$ = Mean fall score for a given teacher and a given variable.

Adjusted Gain Scores

$$G_a = \bar{Y}'_a - \bar{Y}_a$$

Where:

G_a = Adjusted gain score for a given teacher and a given variable.

$\bar{Y}_a$ = Mean spring score for a given teacher and a given variable.

This procedure provided five gain scores for each teacher. The five gain scores served as the major criteria measures. They were subjected to canonical correlation analysis, first with EPPS data and again with TOPS data.

Statistical Treatment

As described earlier, a major analytical tool was that of canonical correlation. Cooley and Lohnes (1962, pp. 35-7) note that "The inter-relations between two sets of measurements made on the same subjects can be studied by canonical-correlation methods. As developed by Hotelling (in 1935 and 1936), the canonical correlation is the maximum correlation between linear functions of the two sets of variables. Several linear combinations of the two sets are frequently possible. Each pair of functions is so determined as to maximize the correlation between the new pair of canonical variates, subject to the restriction that they be independent of previously derived linear combinations....early invest-igators thought that only lambda_1 and the corresponding canonical correla-tion...were of interest. Other workers have expanded on this earlier work and shown that roots other than lambda_1 may be relevant, depending on the research question. One or more subsets of the predictor variables may be related to one or more subsets of the criterion variables..." And further, the elements of prime import are likely to be the canonical coefficients or weights, rather than the correlations, as described

earlier in Chapter 1.

Factor analysis is recognized as a tool that may help reduce the amount of data. Observation data, arising as they do from observation schedules, often provide large amounts of data. The TOPS developed for this project provides scores on sixty observational categories. As noted earlier, the TOPS was thought to include seven or perhaps eight basic factors. The tool of factor analysis makes it possible to determine the underlying structure of the observation data. Did seven or eight factors account for the data? So for the purposes of checking hypotheses as well as for parsimony, factor analysis was employed with the observation data (Horst, 1965; Kerlinger, 1964).

Factor analysis for this project was the principal components method combined with varimax rotation (Horst, 1965).

3. Developing the Teacher Observational Personality Schedule (TOPS)

In 1964, Cooper applied canonical correlation analysis to the fifteen Edwards Personality Preference Scale (EPPS) scores obtained by forty-three elementary school teachers in Nevada and New Mexico and to the five gain scores that these teachers' pupils achieved in arithmetic, reading and spelling on Stanford Achievement Tests. High canonical correlations (.5 to .7) were shown for seven needs from the EPPS. These needs were achievement, abasement, dominance, change, orderliness, affiliation and heterosexuality.

Ficek, et al (1965), developed an observational schedule keyed to these seven needs and standardized it on a sample of eight teachers each of whom was observed two times. Four observers obtained interrater reliabilities of from 0.83 to 0.98, with a median reliability of 0.95, thus demonstrating adequate reliability. The scale also showed that it discriminated satisfactorily between teachers. This scale was called the Behavioral Observational Schedule (BOS).

Development of the Behavioral Observational Schedule

The BOS employed many of the features developed by Medley and Mitzel (1959) in the Observational Schedule and Record. The BOS was used to measure teacher behavior which seemed related to the EPPS needs of achievement, abasement, affiliation, orderliness, change, dominance and heterosexuality as expressed by the teacher's actions in the classroom.

Edwards (1959) describes the manifest needs associated with each of these seven variables as:

> 1. ach Achievement. To do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great

significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. aba Abasement: To feel guilty when one does something wrong, to accept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel depressed by inability to handle situations, to feel timid in the presence of superiors, to feel inferior to others in most respects.

3. dom Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

4. chg Change: To do new and different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the country and live in different places, to participate in new fads and fashions.

5. ord Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details of work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

6. aff Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7. het Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to kiss those of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or

to tell jokes involving sex, to become sexually excited. ( )

Descriptive Definitions of Traits as Applied to Teacher Behavior in the Classroom

The descriptive definitions of the items used in the BOS were based on the above definitions developed by Edwards (1959). The Edwards definitions were structured to enable people to choose between two items, but were not suited for an observational study. The seven traits were, therefore, re-defined to described what takes place in a classroom situation.

1. ach Achievement: To accomplish an assigned task; to be certain to get across material; doing things better than anyone else; to accomplish something difficult; to overcome obstacles and maintain a high level of achievement; to win at competition; to be successful; to show progress; demonstrate superior ability.

2. aba Abasement: Feeling of unworthiness, inferiority; to admit mistakes; to accept blame, criticism; to apologize; to belittle one's self.

3. dom Dominance: To control pupil's activities; to be directive; to influence the actions of others by suggestion, persuasion, or command; to prohibit; to assert one's self; to lead or be in command; to discipline.

4. chg Change: Willing to try something new, different; a variety of teacher methods; flexible ways of presenting the same task; to accept and use suggestions; to approach things differently; to experiment.

5. ord Order: To have everything in its proper place; neat in appearance; systematic presentation of material and bulletin boards; stress a set form for doing things; planned presentation.

6. aff Affiliation: A need to be liked by other people; need to feel accepted, approved; need to associate with people; need to be in a group; to please people; to win affection; to maintain loyalty.

Item Construction

Operational definitions were constructed for each of the seven needs.

Many possible actions were first listed so that a maximum number of items would be avilable for the final draft form of the observation schedule. The final operational definitions were chosen for the schedule by three main constructs; (1) whether or not they pertained directly to the need being investigated; (2) whether or not they pertained only to that one trait; (3) whether or not they would be observable in the classroom in terms of occurring frequently enough to be included in the final observation schedule or too frequently to be meaningful.

The final selection consisted of sixty-four items for the seven needs being investigated and was based upon what Ficek and his co-workers thought would occur in a classroom, on what several professors said might be occurring in a classroom, on what teachers reported occurring in a classroom and finally, on items from Medley and Mitzel's OScAR which could be incorporated in the observation schedule.

Item Organization

The items were organized into a complete unit. Both sign and category systems were used, and the items were separated into individual units for easy observing. The sign system, a list of specific items of behavior which might or might not occur during a period of observation, comprised page one of the BOS. These items were checked only the first time they occurred during any five minute observation period. The six traits measured by items on page one of the BOS were achievement, abasement, dominance, change, order and affiliation. The items were grouped according to the trait they seemed to represent. For example, item "a1," "teacher urges, stresses completion of task" was placed in the sign system under the trait of achievement.

One trait, heterosexuality, was measured by means of a category

system. Items representative of heterosexuality were recorded on page two of the BOS and tallied each time they occurred in the classroom.

Subject and identifying information sections were included so that the observer might avoid observing the same subject (e.g., art) being taught each time and to make it possible to determine whether or not an observed change in a particular teacher's behavior was related to the subject being taught.

Time Organization

Six five-minute periods, alternating between the sign and category systems for a total of thirty minutes were selected as the timing intervals for the BOS. A five minute period was allotted to the general information and general observation section.

Development of the Teacher Observational Personality Schedule (TOPS)

The TOPS is a revision of the BOS and was used by the observers in the present study.

In September, 1966, the three TOPS observers and the principal investigator used the BOS to record teacher behavior in a series of practice observations. Revisions were made at this time, and the schedule was renamed the TOPS.

The revisions consisted of eliminating four items, adding two items which had previously been included on page one of the schedule to page two of the observational schedule and changing the time organization.

Item Organization (TOPS)

The BOS consisted of sixty-four items. The TOPS observers eliminated four of these. The item "teacher suggests a better way to accomplish a task" was eliminated from the items demonstrating the need for achievement because it was found that this behavior could not be readily identified

in the classroom. The frequency with which teachers suggest better ways to accomplish tasks made it difficult to define this item objectively. The item "teacher frowns, glares at pupil" was eliminated from the items grouped under the need of dominance because of the subjective interpretations necessary to determine when a teacher was glaring or frowning. "Teacher works with a group of pupils" was an item listed with items demonstrating the teacher need of affiliation on the BOS. This item was eliminated, because it seemed to be a repetition of another item listed under this same need, "teacher groups class." "Teacher gives objectives of lesson" which had been grouped with items demonstrating the need of order on the BOS was eliminated because of its similarity to another item "teacher introduces lesson."

Two items were added to page two of the TOPS. These items which seemed representative of the need for dominance, are item Xd1, "teacher commands, orders or directs the pupil" and item Xd2, "teacher uses sarcasm." Because of the frequency of occurrence of item Xd1 during the practice observation period, it was decided that the number of times a teacher showed this behavior could be indicative of her needs in this area. It was not eliminated because of its possible importance in determining amount of teacher dominance. The behavior associated with item Xd2, "teacher uses sarcasm" did not occur frequently during the practice observations, but it seemed to be of possible value to be able to record this behavior as often as it occurr

Time Organization (TOPS)

Twenty-two and one-half minutes is required to record teacher behavio in a classroom using the TOPS. An additional five minute time period is suggested as being necessary to allow the class and teacher to become accustomed to the presence of the observer. The observer utilizes this time period by filling out the fixed observation section which requires

information such as the teacher's code number, school code number, observer name, date, time, class size, number of boys in the room, number of girls in the room and identifying information about the room-setting.

It was reported by the observers that avoiding eye contact and any communication with friendly pupils during this first five minute time period made it possible for the observer to continue almost unnoticed during the remaining twenty-two and one-half minutes. The children lost interest in the observer if communication was not facilitated during the first five minutes. They seemed almost oblivious to the presence of the observer.

The traits of achievement, abasement, change, dominance, affiliation and order are observed for a total of fifteen minutes per observation alternating each five minutes between the sign system used on page one of the schedule and the category system used on page two of the schedule. The trait of heterosexuality is observed for a total of seven and one-half minutes during each observation by the category system. Two items, Xd1, "teacher commands, orders or directs the pupil," and item Xd2, "teacher uses sarcasm" are also placed in the category system and observed for a total of seven and one-half minutes.

The major subject taught is checked at the end of each five or two and one-half minute time period. For ease in observing, the sign system is placed on page one of the schedule, that is, each item is checked only the first time it occurs during each five minute time period. The category system is placed on the back of the schedule. The items on this page are tallied each time they occur during each two and one-half minute time period.

To promote ease in scoring, the sixty items in the TOPS were coded. The coded items are listed in Table 3.1.

TABLE 3.1

TEACHER OBSERVATIONAL PERSONALITY SCHEDULE

tot			II	IV	VI
	a1	t urg, sts, compl of tsk			
	a2	t rept inst on assign			
	a3	t grp cl			
	a4	t uses drl			
	a5	t uses enc rmk, pr rwd vrb & nonvrb			
	a6	t u thr t sc imp p prf			
	a7	t cmt on hmwk			
	b1	t apol			
	b2	t admt mistk			
	b3	t gvs in t p demd or compr w p			
	b4	t acps hst objec fr p			
	b5	t alls p spk whot perm			
	b6	t alls p lv st whot perm			
	b7	t asks fo gd cond, copr f p or cl			
	b8	t spks ovr p nos			
	c1	t u tv; radio			
	c2	t lec, rds, tls stor			
	c3	t ill at brd			
	c4	t ill at mp, cht			
	c5	t dems, u vis aid			
	c6	t shs flm, sld ply rec, piano, tape			
	c7	t wrks at dsk			
	c8	t chgs fr ind-grp Class v.v.			
	d1	t wrn, the p			
	d2	t punsh p			
	d3	t clls on non-vol			
	d4	t rest pb t kp disc t pt			
	d5	t sel ch or grp fo spc act			
	d6	t igs, intr, p ans or qust			
	f1	t wks wh ind p			
	f2	t encs p-grp--class interr			
	f3	t encs p t hlp ech other			
	f4	t shs aff fo p			
	f5	t is pol, court t p			
	f6	t is will t hlp p aft cl			
	f7	t protecs p			
	f8	p ask fo hlp a t hlpd imm			
	01	t plc outl, ques on brd			
	02	t insis p dks clr exc prtn mt			
	03	t intro les			
	04	t gts bd crasd			
	05	t strs form, nt wk			
	06	t stns dsks, blds, curt			

Room Set

Teacher: ______
School: ______
Observer: ______
Date: ______
Time: ______
Class size: ______
Boys: ______ Girls: ______

Observation Section

Tot I		
	Xc1	t chs bul bd btw obs
	Xc2	t chs rm set btw obs
	X01	vis ad nt a org
	X02	t dsk neat; orderly
	Xa1	t us prg cht

Subject Section

II	III	IV		V	VI	VII
			Reading			
			Math			
			Language Arts			
			Social Studies			
			Science			
			Recreation			
			Arts & Crafts			
			Social Processes			
			Test			
			Other			

Each Time Scale

tot		III	V	VII
	h1 t cal tks, inter p op sx			
	h2 t prs p op sx			
	h3 t cals p op sx hny, der, etc			
	h4 t tchs p op sx			
	(acad. o beh.) h5 t wrhs, tht, punishes p op sx			
	h6 t cal tks, inter p sm sx			
	h7 t prs p sm sx			
	h8 t cal p sm sx hny, der etc			
	h9 t tchs p sm sx			
	t crit or corr p sm sx h0 acad. o beh.			
	Xd1 t cmds ord dir p			
	Xd2 t uses scsm			

Comments:

Operational Definitions

The examples given below are not intended to be all-inclusive, but are intended to provide representative samples of types of behaviors to be observed. The items are grouped according to the seven EPPS traits which the TOPS purports to measure. Identification of a behavior can be facilitated during classroom observations by, subjectively, attempting to determine the teacher's motives for her statements or actions. In most instances, identification of the item to be checked should not be difficult, because the items are intended to be objective and specific to a particular act or verbalization on the part of the teacher.

Achievement:

a1 Teacher urges, stresses, completion of a task: "I want every problem completed." "Let's see how many we can get done." "Finish it, even if you have to take it home." "You can finish that, can't you?"

a2 Teacher repeats instructions on assignment (or any part of assignment): "I'll go over the instructions one more time." "Remember, the lesson for tomorrow is......" "Johnny, will you tell us what we have to do?" "Let's review what we did yesterday." "Remember to follow the directions." "Repeat what I just said." (Teacher may repeat these instructions to a pupil, a group of pupils or to the class as a whole.)

a3 Teacher groups class: "All right, Red Birds get out your reading books. Blue Birds will do their arithmetic." "Group one to the board." "Let's get into our groups." (This will include any division of the class for greater achievement purposes, wherein the teacher works with a selected group.)

a4 Teacher uses drill: "Let's go over that again." "Repeat after me." "Let's go through the vowels." "2 X 3, 2 X 3, 2 X 3. We'll work on this until you get it." (This item should be checked when flash cards are used by the teacher.)

a5 Teacher uses encouraging remarks, praise or verbal rewards: "Excellent!" "Fine!" "That's good!" "Muy bien!" "Class, look at the fine job Roger has done on his drawing." "Very nice."

a6 Teacher uses threat to secure improved pupil performance: (Verbal comments on academic performance) "You'd better get that answer by Friday, or else!" "If you don't study more, you'll be in the fourth grade again next year!" "If you

don't do your work, you'll have to see the principal." "If I have to speak to you again, you'll have an extra assignment."

a7 Teacher comments on homework: (Any comment mentioning homework)

Abasement:

b1 Teacher apologizes: (Any apologetic word, phrase or sentence) "I'm sorry, John." "I'm terribly sorry about the delay in returning your papers." "Forgive me, Tom. Please continue."

b2 Teacher admits mistake: "You're right, Mary. I gave the wrong answer to that question." "Yes, I did add wrong. Teachers make mistakes, too." "That's right, I did say that yesterday, but I found I was wrong."

b3 Teacher gives in or compromises with pupil or class: (Need not be a verbal request on the part of the pupil) "Since you have all requested a postponement of the test until Friday, we will have the test then." "You did the wrong paper, but I'll accept it."

b4 Teacher accepts hostility or objections from pupil or class: (Teacher accepts flat refusal by pupil to do assignment or to fulfill some other requirement.) "I'll tell my Daddy if you make me stay after school." "Who cares if you give me an F?" "How come you tell Johnny the words, but you won't tell me the words?" (Teacher tells pupil to get busy, and he responds with a derogatory remark.) "Oh, nuts!" (Teacher pretends not to hear this remark and walks away from the pupil.)

b5 Teacher allows pupil to speak without permission: This includes any comment without permission, loud enough to be heard by the class. Teacher allows pupil to insert comments, questions, answers without being called upon. The teacher is working with a group, and members of the rest of the class carry on conversations which can be heard by the rest of the class.

b6 Teacher allows pupil to leave seat without permission: Pupil leaves seat to sharpen pencil, get reading material, go out of room, ask another student for help, etc., without raising his hand or requesting and receiving permission from the teacher. Any separation of a student from his desk or chair.

b7 Teacher asks for good conduct, cooperation from pupil or class: "Please, class, let's have less noise." "If you will please be quiet for the next fifteen minutes, I won't have to give you an assignment."

b8 Teacher speaks over pupil noise: Teacher raises voice to be heard over individual conversations, rustling of papers, movement about the room, shuffling of desks, pupil movement without commenting on the noise or waiting for noise to subside.

Change:

c1 Teacher uses television or radio: Teacher utilizes a radio or television program as a part of regular classroom activities.

c2 Teacher lectures, reads, tells stories: "When I was a little girl...." "....and that's how they did it long ago." "Today, I am going to tell you about." (May be part of the lesson or need not be. This could be a lecture or story of short duration.)

c3 Teacher illustrates at board: Teacher writes on board showing correct procedures for arithmetic problems, correct spelling, correct sentence structure; makes chart showing historical sequence. (Teacher may point to information already on the board.)

c4 Teacher illustrates at map, chart or globe: Teacher uses roll-down map or globe, map in book, prepared chart or chart in book, etc. Teacher allows child to go to map, chart, or globe.

c5 Teacher demonstrates, uses visual aids: Teacher uses abacus, solar system, human body, picture, etc. to demonstrate. Teacher shows how some kind of apparatus works, or demonstrates some phenomenon.

c6 Teacher shows film or slides, plays record, operates tape recorder.

c7 Teacher works at desk: Teacher may sit or stand at her desk. This need not be for a period of long duration.

c8 Teacher changes from individual to group to class or vice versa: The actual change is the important thing to observe here. (Not individual to individual)
Pupil to group or group to pupil.
Group to group.
Group to class or class to group.
Pupil to class or class to pupil.

Dominance:

d1 Teacher warns the pupil: Verbal consequences must be stated. This must concern itself with non-academic behavior of the pupil or class. Academic threats and warnings are recorded in the achievement category, item a6. "You had better not poke John with that ruler again." "Behave, or

you'll suffer the consequences." "I'll do more than just talk to you the next time."

d2 Teacher punishes pupil: This may be a punishment which takes physical or verbal form. "Take your books and sit at that table in the back of the room." "Stand up right there by your desk until I tell you to sit down." "Go to the principal's office. Tell him why I sent you." "You're invited to our after-school party, today, in this room!" (It has been observed that children are often isolated from the rest of the class by having their desks at an obvious distance from those of the other children. This observation is not checked by the observer on the schedule, because it is seldom possible to determine the teacher's motives for isolating the children. For the same reason, a record is not kept of children who seem to be undergoing punishment when the observer arrives, when no verbal mention of this has been overheard by the observer.)

d3 Teacher calls on non-volunteer: The teacher calls on a pupil who has not raised his hand or otherwise indicated his willingness to participate. Teacher may say, "I want to call on someone who hasn't answered yet."

d4 Teacher restates problem to keep discussion to the point: "Please, national news, not local news." "That's interesting, but let's get back to mathematics." "Let's read the original problem again." "That's not in the realm of science."

d5 Teacher selects child or group of children to perform a specific <u>non-academic</u> activity: "Johnny, would you please clean up the mess in back." "Tom, take this to the office for me." "Bill and Chuck, would you pass out the milk?" "These four (pointing) will have responsibility for the bulletin board, fish bowl, etc."

d6 Teacher ignores, interrupts, rejects pupil comment, question, or answer to questions.

Affiliation:

f1 Teacher works with individual pupil: <u>Teacher</u> makes the first move--goes to pupil's desk or summons pupil to her desk--walks around the room helping individuals.

f2 Teacher encourages or allows class or group interaction: "Let's see if we can help Johnny out." "Let's work together." This includes committees which may be working while the teacher is involved elsewhere. More than two pupils should be interacting.

f3 Teacher encourages or allows pupils to help each other: "Why don't you two work on your number facts?" "Bill,

you help Joe with that problem." "Mary, drill Susie on the parts of speech." No more than two pupils should be interacting here.

f4 Teacher shows affection for pupil: This involves some sort of personal, non-academic attention on the part of the teacher. It does not include words of endearment such as honey, dear. If a pupil is hurt or sick, the teacher comforts him. The teacher will listen to a pupil when he has something to say--something which has happened, and which he considers important.

f5 Teacher is polite and courteous to pupil: "Please." "Excuse me." "Thank you." etc.

f6 Teacher is willing to help pupil after class: (Must not be for punishment purposes) "Stay in at recess, and we'll go over that again." "Come in before the last bell, and I'll help you." "Stop by for a few minutes after class. I'll explain it to you then." "If you can arrange to have your parents pick you up, I'll help you with your arithmetic after school."

f7 Teacher protects pupil: "We all make mistakes, Susie." "That's all right, John." "Boys and girls, he has a perfect right to his opinion." "Yes, Bill. That's right! However, Mary's right when she says...." "You are both right."

f8 Pupil asks for help and teacher helps immediately: (Pupil makes first move.) Pupil raises hand, and teacher goes to pupil's desk to help him. Pupil goes up to teacher, and teacher helps him.

Order:

01 Teacher places outline, questions on the board, or refers to outline, questions already on the board: "The major points of the issue are ...." (pointing to the blackboard). "Who can tell me step one in solving this division problem?" (Teacher writes steps as given.)

02 Teacher insists desks clear except for pertinent material: "Put everything away except your notebooks." "Clear your desks, and open your spelling books to page 25."

03 Teacher introduces lesson: "Yesterday, we finished our unit on multiplication, and today, we will begin division." "In multiplication, we learned two ways of multiplying, the old method and the new method. So far, we have learned the old method. Today, we begin learning the modern method." "Our lesson is geography, today, will be on the South American countries. We are going to hear reports on Brazil." (Any introductory statement concerning objectives of lesson coming up.)

04 Teacher gets board erased: Teacher may erase all of the blackboards or a portion of the board. She may request a pupil's help in erasing the board.

05 Teacher stresses form, neat work: The teacher may call attention to messy work. "This is hard to read." "Remember to put your name on the right hand corner of the page." "Write in ink and only on one side of the paper." "This is the correct way to make a division sign."

06 Teacher straightens desk, blinds or curtains: The teacher may have a pupil do this for her. Teacher walks over to the windows and raises or lowers the blinds; so that they are all at the same height. "Bob, will you raise the blinds; so that they are all at the same height." "Let's straighten the chairs in this reading corner."

Room Set:

The box on page one of the observational schedule is to be used to record arrangements of pupils' desks, position of student study tables, positions of teacher's desk, etc. Some sort of record may be made here of the types of material displayed on the bulletin boards. This will facilitate recognition of any change in bulletin boards or room set from visit to visit. (Each observer should record these changes from his own observations and should not necessarily compare notes with the other observers.) Items Xc1 and Xc2 are recorded after the first observation time using this information.

Xc1 Teacher changes bulletin board between observations: (May be all bulletin boards or just one bulletin board.)

Xc2 Teacher changes room set between observations.

Xo1 Teacher's visual aids are neat and organized: Posters, reference books are arranged neatly.

Xo2 Teacher's desk is neat, orderly, systematic: (Pupil's papers, books, etc. are arranged on the desk in some systematic pattern).

Xa1 Teacher uses progress chart: Childrens' names with number of books read, spelling, arithmetic charts indicating childrens' progress.

Subject Section:

A record should be kept of what is being taught during each time period. This will be what the teacher is involved in teaching at the time of observation although children may be working on different things.

Category System:

These items are recorded each time they occur during each two and one-half minute period.

Heterosexuality:

An attempt is made here to record the number of interactions between the teacher and the pupils of both sexes.

h1 is a general category and is used only if the observed behavior cannot be recorded in categories h2, h3, h4, and h5.

h6 is a general category and is to be used only if the observed behavior cannot be recorded in categories h7, h8, h9 and h0.

h1 Teacher calls, talks, interacts with pupil of opposite sex. Male teacher says, "Mary, will you take the next one?" Female teacher walks over to talk to male pupil; male pupil comes up to talk with female teacher; male teacher helps female pupil with problem; female teacher calls male pupil to her desk. This applies only to random interaction with an individual and not to sequential questioning.

h2 Teacher praises pupil of opposite sex: "That's good, fine." "Very good." "Excellent."

h3 Teacher calls pupil of opposite sex honey, dear, etc. (any endearing term directed at member of opposite sex.)

h4 Teacher touches pupil of opposite sex: (includes accidental or intentional physical contact).

h5 Teacher warns, threatens or punishes pupil of opposite sex (this may include severe criticism).

h6 Teacher calls, talks, interacts with pupil of same sex.

h7 Teacher praises pupil of same sex.

h8 Teacher calls pupil of same sex honey, dear, etc.

h9 Teacher touches pupil of same sex.

h0 Teacher warns, threatens or punishes pupil of same sex.

Xd1 Teacher commands, orders, directs group or class. This item differs from the other items on the category scale in that it was deemed necessary to record the dominating behavior of the teacher which occurred, and which was directed at more than one pupil. (This behavior must be directed at more than one individual. Behaviors relating to specific individuals are recorded under the need heterosexuality.)

Xd2 Teacher uses sarcasm: This item is recorded each time a teacher makes a bitter, cutting remark or a statement which has an intended implication which seems to be the opposite of the literal sense of the words; a cutting criticism which is made in the form of a jest or a statement which has a distinguishing quality of bitterness or taunting reproachfulness. "John Jones, are you in this reading group, or do you think this is recess time?"

Summary

Based upon earlier theoretical considerations, as well as by empirical data, a Medley-Mitzel OScAR type of observation schedule was prepared. Its purpose was to record those behaviors thought to be reflective of certain underlying psychological needs as measured by the Edwards Personal Preference Schedule. Each item in the schedule, the Teacher Observation Personality Schedule (TOPS), was operationally defined and field-tested. Three observers were trained in its use as described earlier.

4. Analysis of Teacher Observation Personality Schedule Data

The sixty teachers were observed for nine periods each; the observation data were recorded on the Teacher Observation Personality Schedule (TOPS) described earlier. For each observational category, a total score was obtained by simply summing the total number of times in the nine observations that the particular behavior had occurred. For example, if Mrs. Salas had been observed to "touch a pupil of the same sex" sixteen times during the nine observations periods, her score for that behavior was sixteen. This procedure yielded sixty scores for each of the sixty observed teachers (the fact that we had sixty observation categories and sixty teachers is pure coincidence; it was not planned that way). Now it is probably apparent that analyses with sixty TOPS scores are likely to become unwieldy. Not only that, but our computer (IBM 360) was not always up to handling sixty variables plus others that were desired (EPPS scores and gain scores). It was desirable to reduce these scores to a smaller number in such a manner as to retain, or even augment, their psychological and educational significance.

The summary of means and standard deviations for each of the sixty observational categories is reported in Table 4.1. The table shows that some behaviors occurred with relatively high frequency, e.g., 50 and 55 with means of 65.07 and 51.47 respectively, whereas a few behaviors were seen but infrequently, as was the case for behaviors 29 and 60 with means of 0.83 and 0.50. The standard deviations showed considerable variability, too, ranging from 0.72 to 16.34. Consequently, it was necessary to transform these scores into standard, or "z" scores. Such scores have the property of having the same mean, in this case, zero, and a standard deviation of one. Thus, the effects of widely different means and

TABLE 4.1

Teacher Observation Personality Schedule

Results of Raw Data

Variable	Mean	Stand Deviation	Variable	Mean	Stand Deviation
1	3.48	2.51	31	0.87	1.15
2	7.08	3.60	32	5.15	3.33
3	6.05	4.66	33	3.07	2.62
4	2.25	2.11	34	7.52	3.46
5	13.15	4.21	35	3.68	3.23
6	0.95	1.62	36	1.52	1.95
7	0.97	1.18	37	5.37	3.72
8	1.68	2.02	38	9.73	4.99
9	1.00	1.22	39	0.20	0.51
10	0.75	0.89	40	1.28	1.43
11	0.62	0.86	41	8.75	4.86
12	0.18	0.72	42	1.65	1.71
13	15.78	6.11	43	1.40	1.31
14	17.42	4.75	44	3.58	1.99
15	1.17	1.38	45	1.63	1.88
16	1.28	1.92	46	2.92	2.30
17	1.02	1.51	47	1.18	1.15
18	2.75	2.78	48	8.48	1.10
19	7.47	3.51	49	6.50	1.95
20	0.85	1.15	50	65.07	16.21
21	1.47	2.09	51	2.65	2.67
22	1.03	1.94	52	1.03	2.29
23	3.32	2.95	53	4.37	4.64
24	3.52	1.93	54	6.80	5.61
25	3.82	1.60	55	51.47	16.34
26	1.23	1.22	56	1.98	2.11
27	2.48	2.06	57	1.12	2.68
28	25.17	10.57	58	3.45	7.55
29	0.83	1.08	59	3.87	3.55
30	6.37	4.28	60	0.50	1.07

standard deviations. Radical differences of these kinds are known to seriously bias subsequent analysis, especially factor analysis and canonical analysis.

Factor analysis is a means by which data reduction and hypotheses testing may be accomplished. There are many models available to the factor analyst (Horst, 1965). Kerlinger (1964), presents a relatively simple explanation for the non-mathematician, and certain computational routines are readily available (Cooley and Lohnes, 1962). Despite objections raised by Cattell (1966), we analyzed our data according to the principle components followed by varimax procedure. The major strengths of this particular method are that it usually reveals combinations of scores (in this case, TOPS scores) which produce the greatest degree of discrimination of persons for a given factor and also reveals the underlying factor structure. The computations were performed at The University of New Mexico's Research Computer Center on their IBM 360 with Croft's (1965) program.

For those unfamiliar with factor analysis, a small digression may be in order. The method asks of the data, "Which behaviors are correlated? Which things that these teachers did in their classrooms 'hung together'? Were there certain patterns of behavior that distinguished some teachers from other teachers?" Experience with the teaching scene would support the notion that there are, indeed, certain patterns of teacher behavior that are unique. Most of us can identify the "friendly" teacher, the "chilly Charlie," etc. So factor analysis is simply an arithmetic method whereby groups of behavior or patterns of behavior may be identified.

In the presentation that follows, several different analyses are offered to shed light upon two questions:

1. What is the underlying factor structure of behavior observed in this sample?

2. To what extent can the underlying factors be "compressed" into eight factors; and do these relate to the underlying rationale of the TOPS?

General

The first analyses were conducted with raw scores, that is, the sixty scores obtained for each teacher by adding all of her scores for a given scale. It was noted that some behaviors occurred with considerable frequency, e.g., "Teacher uses encouraging remark" or "Teacher commands, orders or directs the pupil," but that others were quite infrequent: "Teacher accepts hostility or objections from the pupil," or "Teacher uses sarcasm." The respective means and standard deviations for these four behaviors were: 13.15 - 4.21; 25.17 - 10.57; 0.18 - 0.72; and 0.50 - 1.07. These discrepancies could have been met by either eliminating these behaviors which occurred infrequently, or by transforming the raw scores into standard scores (either "z" or "T"). We chose the latter, because at this stage, we were still searching for teacher behaviors which were related to pupil gain, and, therefore, felt it premature to discard observation data. We noted, however, that some twenty-eight items or 47% of the items had mea[illegible] of less than 2.0, i.e., that on the average, twenty-eight of our behaviors occurred fewer than twice per teacher during nine separate observations.

The factor analyses and subsequent canonical analyses were conducted with standard scores. It was interesting to note that this procedure did not change the underlying factor structures, or the correlation matrices.

The Basic Factor Structure Underlying the TOPS

The initial factor analysis yielded twenty factors, one of which was "imaginary" and, at least, one other whose interpretation is not clear. The nineteen factors, the items comprising them, their eigenvalues and the cumulative percentage of variance accounted for are reported in Table 4.1. The table shows, for example, that Factor One included three behaviors, asking for good conduct, speaking over pupil noise and insisting that desks be kept clear. This looks like a "classroom management" cluster; its eigenvalue of 6.23 accounted for about 10% of the total variance of teacher behavior.

TABLE 4.2

The Nineteen Factors Underlying the Teacher Personality

Observation Schedule

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
1	Teacher asks for good conduct.	83	6.23	10.38
	Teacher speaks over pupil noise.	58		
	Teacher insists pupils keep desks clear.	-57		
2	Teacher calls pupil of same sex honey, dear.	83	4.93	18.59
	Teacher demonstrates or uses a visual aid.	78		
	Teacher calls pupil of the opposite sex honey or dear.	71		
	Teacher lectures or reads or tells a story.	61		
	Teacher shows affection for a pupil (s).	47		
3	Pupil asks for help and teacher helps immediately.	81	4.16	25.53
	Teacher touches pupil of the same sex.	79		
	Teacher calls on or talks with pupil of the same sex.	72		
	Teacher touches pupil of the opposite sex.	57		
	Teacher works with an individual pupil.	56		

* The decimal points have been omitted.

TABLE 4.2 Continued

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
4	Teacher praises a pupil of the opposite sex.	-83	3.21	30.88
	Teacher changes the room between observations.	-40		
5	Teacher places outline or questions upon the board.	76	2.99	35.86
	Teacher illustrates at the board.	71		
	Teacher repeats instructions on assignment.	57		
	Teacher uses a progress chart.	50		
6	Teacher groups the class.	84	2.79	40.51
	Teacher allows pupil (s) to leave seat without permission.	67		
	Teacher changes from working with an individual to group, or vice versa.	59		
7	Teacher criticizes or corrects a pupil of same sex.	80	2.71	45.04
	Teacher uses sarcasm.	64		
	Teacher punishes a pupil.	64		
	Teacher is polite or courteous to a pupil.	-40		
	Teacher shows a film or a slide, or plays a record.	-16		

* The decimal points have been omitted.

TABLE 4.2 Continued

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
8	Teacher accepts hostility or objection from pupil.	87	2.36	48.99
	Teacher gives in to pupil demand.	63		
	Teacher warns or threatens or punishes pupil of opposite sex.	74		
	Teacher warns the pupil.	54		
	Teacher admits mistake.	52		
9	Teacher comments on homework.	-78	2.19	52.63
	Teacher urges or threatens in order to secure improved pupil performance.	-56		
10	Teacher commands, orders, or directs the pupil.	80	1.96	55.89
	Teacher ignores, interrupts pupil answer or question.	65		
	Teacher calls on a non-volunteer.	64		
11	Visual aids are neat and well-organized.	81	1.90	59.05
	Teacher straightens the desks, or blinds, or curtains.	44		
12	Teacher encourages pupil-group-class interaction.	80	1.93	62.27
	Teacher allows pupil (s) to speak without permission.	45		
	Teacher restates the problem to keep the discussion to the point.	38		

* The decimal points have been omitted.

TABLE 4.2 Continued

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
13	Teacher uses TV or radio.	49	1.69	65.08
	Teacher changes bulletin board between observations.	-82		
14	Teacher illustrates with a map or a chart.	-88	1.63	67.80
15	Teacher gets the board erased.	-84	1.46	70.23
	Teacher selects a child or a group for a special activity.	-52		
	Teacher protects the pupil.	-47		
	Teacher apologizes.	-43		
16	Teacher uses an encouraging remark.	-77	1.38	72.52
	Teacher stresses form or neat work.	-59		
	Teacher's desk is neat and orderly.	-38		
17	Teacher introduce the lesson.	53	1.23	74.57
	Teacher urges completion of a task.	-75		
	Teacher works at her desk.	-37		
18	Teacher uses drill.	42	1.17	76.52
	Teacher is willing to help pupil after class.	-81		

*The decimal points have been omitted.

TABLE 4.2 Continued

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
19	Teacher asks pupils to help each other.	70	1.13	78.41
	Teacher praises a pupil of the same sex.	50		
	Teacher calls on, talks to, interacts with pupil of opposite sex.	-59		
20	An "imaginary" factor (the items loaded better elsewhere).		1.05	80.16

*The decimal points have been omitted.

Factor two was comprised of items reflecting warm, verbal support. The items, "uses visual aid" and "lectures or reads a story" raised eyebrows in the research camp, because these two did not seem to be of the same stuff as showing affection or calling pupils "honey" and "dear." However, the observers reported that the behaviors in question were in fact expressions of warmth: the pupils were often grouped in a small circle while the teacher acted; the action was usually a warm, friendly sort of experience. This factor accounted for 8% of the variance.

Factor three is similar to factor two, but it included physical contact behaviors in a warm, supporting relationship. The "touching" behaviors observed in this study were usually friendly expressions, rather than punitive or corrective. Thus the factor might be termed, "Warmth and support through physical contact." The factor accounted for 7% of the variance.

Factor four is unclear. The communality expressed by "changing the room between observations" and "praising a pupil of the opposite sex" is not immediately apparent. Possibly the interpretation is clouded by the inclusion of two items of different loadings: -.83 and -.40. The factor accounted for 5% of the variance.

Factor five suggested the organized presentation of instructional material, since its items are outlining, illustrating at board, repeating instructions, and using progress charts. A push on the teacher's part to secure pupil learning seems included. Five percent of the variance was accounted for by this factor.

Factor six may reveal a "group dynamics" component, as it includes the behaviors, "teacher groups the class," allows pupils to move about without permission, and changes from group work to working with an

individual pupil. About 5% of the variance was taken care of by factor six.

Four of the five behaviors of factor seven disclose a bipolar factor whose terminals are critical punishment and polite or courteous behavior on the teacher's part. A fifth behavior, "Teacher shows a film, slide, etc." loads only -.16; it was included simply because there was no better place to put it. The factor is responsible for 5% of the variance.

Factor eight reflects abasing behavior, since it includes the teacher's accepting pupil hostility and demands, but possibly reacting with treats or punishments. In other words, this teacher apparently tries to be "nice," but can't quite swing it, with hostility emerging as a consequence. The factor accounted for 4% of the variance. The possible cause and effect relationships between accepting hostility or admitting mistakes and consequent hostility might be examined via a Flanders (1963) type observation schedule which focused upon these and similar behaviors.

Factor Nine possesses two items relating to securing pupil performance and improved homework. Three percent of the variance was explained by the factor.

Factor ten suggests dominating behavior running rough-shod over the pupils. It accounted for 3% of the variance.

Factor eleven is a "neatness" component of teacher behavior. It accounted for 3% of the variance.

Factor twelve would characterize the group discussion oriented approach to instruction. The factor explained the whereabouts of 3% of the variance.

The thirteenth factor is not clear. It contrasts two behaviors; one using TV or radio, but NOT changing the bulletin board between observations. This factor accounted for 3% of the variance.

Factor fourteen contains but one behavior: "Teacher illustrates with map or chart." This behavior was responsible for 2% of the variance.

Factor fifteen looks like a possible "group maintenance" cluster. It includes the behaviors of the teacher getting the board erased, protecting a pupil, selecting some one to do a special task, or apologizing. It accounted for 2% of the variance.

Factor sixteen includes getting the work done neatly, and with teacher encouragement. Two percent of the variance was involved.

Factor seventeen suggests a certain businesslike approach to classroom learning, in that the teacher scoring high on the factor can be expected to encourage pupils, stress neatness, and work at her desk. Another 2% of the variance was included.

Factor eighteen includes two opposite behaviors: the teacher who uses drill is NOT expected to be found helping the pupils after class. The factor accounted for 2% of the variance.

The last factor, nineteen, is another set of group oriented behaviors. Teachers who score high on this factor may be found asking pupils to help each other, praising pupils of the same sex, but withholding interaction from pupils of the opposite sex. It, too, was responsible for 2% of the variance.

Summary of the Basic Factor Structure

The nineteen factors underlying the TOPS appear to be the following:

1. Classroom management.

2. Warm, verbal support.

3. Warm, physical support.

4. Unclear (changes room and praises pupil of opposite sex).

5. Organized presentations.

6. Group process orientation.

7. Critical punishment vs. courtesy.

8. Ambivalence.

9. Concern with pupil achievement.

10. Domination without concern for pupil feelings.

11. Neatness.

12. Group discussion orientation.

13. Unclear. This teacher uses TV but does NOT change the bulletin board.

14. Unclear. The teacher illustrates with a map or chart.

15. Group maintenance.

16. Encourages neat work.

17. Businesslike management of learning.

18. Drill exercises without help outside of class.

19. Group approach to pupils of same sex.

These basic patterns of teacher behavior, as elicited from our TOPS, were the basis for subsequent analyses. Could these behaviors be predicted by a teacher's scores upon the EPPS? And, were these behaviors important in-so-far-as pupil gain was concerned?

Factor Structure of the TOPS Based on A Priori Reasoning

As described earlier, the TOPS was designed to record behavioral manifestations of seven needs as measured by the EPPS. These needs were

achievement, abasement, affiliation, change, dominance, order and heterosexuality. For our purposes, heterosexuality was further defined as including those behaviors involving the same sex and those involving the opposite sex. If the TOPS actually measured these elements, it should be possible to extract eight factors bearing some resemblance to these a priori considerations. To this end, the sixty TOPS behaviors were factored, this time with the instructions, "Extract ONLY eight factors." The resulting eight factors, their items and factor loadings are presented in Table 4.3. The table shows that the eight "forced" factors account for 49% of the variance. The factors themselves and their possible significance are worthy of closer examination.

Factor one includes such behaviors as asking for good conduct, commenting on homework accepting pupil hostility, speaking over pupil noise, and warning and threatening the pupils. This seems to describe the teacher who attempts to act in an accepting manner, but gets overrun by the class; she must often plea for improved conduct. We termed this constellation, "Ambivalent pupil acceptance."

TABLE 4.3

Eight Factors From the TOPS Based Upon A Priori Reasoning

Factor Number	Items Comprising Factor	Factor* Loading	Eigen-value	Percentage Variance Acc't. For
1	Teacher gives in to pupil demand.	74	6.23	10.38
	Teacher speaks over pupil noise.	72		
	Teacher uses threat to secure improved pupil performance.	64		
	Teacher warns the pupil.	56		
	Teacher warns or threatens pupil of opposite sex.	55		
	Teacher accepts hostility or objection from pupil.	55		
	Teacher asks for good conduct.	51		
	Teacher allows pupil (s) to speak without permission.	48		
	Teacher comments on homework.	40		
	Teacher admits mistake.	37		
	Visual aids are neat and well-organized.	-50		

* The decimal points have been omitted.

5. Analysis of Pupil Gain

Five sections of the S.R.A. Achievement Series were given to the total sample of 1438 students in the fall and following spring. These sections were:

Reading Comprehension	(Read Comp)
Reading Vocabulary	(Read Vocab)
Arithmetic Reasoning	(Arith Reason)
Arithmetic Concepts	(Arith Conc)
Arithmetic Computation	(Arith Comp)

As a total group scores improved in the following manner.

Table 5.1

Achievement Scores for Total Sample (N=1438)

	read comp	read vocab	arith reason	arith concpts	arith compt
Fall Mean	17.9	15.5	14.9	13.7	7.9
Spring Mean	19.0	19.1	16.6	16.3	9.7
Fall Grade Placement Equivalent	4.8	4.7	4.6	4.2	4.1
Spring Grade Placement Equivalent	5.1	5.4	4.8	4.7	4.5
Months of Gain	2	5	2	3	4
Correlations	.70	.74	.55	.73	.44

This showed an average gain in each area of achievement from two months to five months depending upon the area. A correlation between the fall and spring means for the total group for each of the five tests was significant at the .05 level, with the lowest correlation of .436 being between fall and spring tests of arithmetic computation.

Student scores for individual teachers were subjected to statistical analysis of the mean standard deviation, and correlation. A predicted spring mean was calculated by regression analysis for each test area given

The second factor might be termed, "Warm, verbal acceptance." This factor includes such behaviors as showing affection, calling pupils honey or dear, politeness, and using praise for pupils of the same sex. This teacher also employs visual aids and tells stories.

Factor three describes the teacher who is organized, touches pupils, interacts with pupils of the same sex, protects pupils, and works with individual children. This teacher is less likely to use slides or change the bulletin board between observations. The factor might be named, "Pupil progress through affection and physical contact."

Factor four includes several opposite behaviors. Teachers scoring high on this factor can be expected to work at their desks, work with individuals and groups, but NOT use such amenities as praise, encouragement, the board, or introductions to lessons. This cluster was named, "Low affect, keep them at a distance."

Factor five appeared to be "Organized achievement." These teachers were likely to repeat instructions, urge task completion, and stress neatness in pupils as well as themselves.

Factor six seems to describe "the group oriented teacher." For those scoring high on this factor, we would expect to see pupils working with each other, but NOT the use of TV or radio. Maybe these mechanical tools are viewed as inhibiting group interaction.

Factor seven is "Critical non-acceptance." It includes criticizing, correcting, punishing and sarcastic behaviors. It was interesting, too, that "drill" loaded negatively (-0.35) on this factor.

The eighth factor may be "Insensitive classroom management." The behaviors included were those of restating a problem, commanding and ordering, ignoring, calling on non-volunteer, apologizing, and encourag-

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course, that the TOPS itself was at fault. Perhaps the a priori judgments of what constituted, say, abasing behavior, were not entirely correct. The factor analytic data are not clear on this point; one would need other evidence.

In summary, we can see that we are faced with the problem of two equivalent hypotheses, neither of which can be supported or rejected. On the one hand, it seems reasonable to expect behavior to appear as the consequence of several needs operating at once. Or, it may be that our selections of behaviors were not entirely apropos to the underlying need. These data do stress the importance of testing one's hypothetical constructs. Only by tests in the field, in the school and in the classroom, can we be sure that our reasoned analyses have in fact dealt with psychological reality. In the present instance, it would seem that the TOPS measured behaviors in the same ballpark as postulated by the EPPS, but one-to-one identities were not established.

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Student scores for individual teachers were subjected to statistical analysis of the mean standard deviation, and correlation. A predicted spring mean was calculated by regression analysis for each test area given

by the teacher (see Chapter 2). This predicted mean was subtracted from the actual spring mean to yield the teacher gain. The better the teacher's students did than predicted, the higher was the adjusted gain. If a teacher's students did poorer than was expected, negative gains occurred. For the purpose of canonical analysis, the adjusted gains were converted to T scores by the following equation:

$$T = \frac{Ga - Gm}{Gs} \times 10 + 50$$

where

Ga was the adjusted gain
Gm was the mean for the adjusted gains
Gs was the standard deviation of the adjusted gains.

A teacher whose T score fell below 30.4 or above 69.6 was considered to have an adjusted spring gain significant at the .05 level. The adjusted raw score gains are reported in Table 5.2. A change of one point in Reading Comprehension or Reading Vocabulary is equal to about three months of change in grade level equivalents. Similarly, one point of raw score change in Arithmetic Reasoning is equal to about one month of change in grade level, and one point of change in Arithmetic Concepts and Arithmetic Computation equals about two months of change in grade level.

A plus score shows that the teacher's gain exceeded our predictions; a gain (or change) of from -.05 to +.05 shows that the teacher's gain was that which we had predicted, and a negative gain identifies those teachers whose gain was less than that predicted.

Table 5.2 should be read as follows: Teacher 1-2 had 23 pupils. The adjusted gain in Reading Comprehension of -.27 was slightly below that predicted; the gain of -1.66 in Reading Vocabulary was about five months less that we had expected; the -2.32 in Arithmetic Reasoning was below our prediction; the -.13 and -.99 in Arithmetic Concepts and Arithmetic Computation were below our predictions.

Table 5.2

Adjusted Teacher Gains

Teacher	Number of Pupils	Read Comp	Read Vocab	Arith Reason	Arith Conc	Arith Comp
1-1	29	.04	2.44	.17	4.10	.97
1-2	23	- .27	-1.66	-2.32	- .13	- .99
1-3	22	- .11	-1.96	.50	- .53	- .20
2-1	22	.76	.58	-1.01	1.93	-1.32
2-2	21	1.88	2.08	.86	.77	- .58
2-3	24	.62	- 38	1.64	-1.95	- .87
2-4	22	.90	- .76	-1.56	1.20	-1.00
3-1	23	2.34	.88	-1.01	- .32	-1.69
3-2	24	2.12	1.89	1.97	.13	1.38
3-3	19	1.21	.29	2.27	1.78	1.90
4-1	27	-2.77	-1.22	-1.63	.81	-1.06
4-2	27	.28	.56	.36	- .10	-1.06
4-3	29	.53	- .13	- .33	-2.09	.10
4-4	23	- .21	-1.14	.40	- .07	.10
5-1	25	- .07	-1.45	.95	- .49	- .40
5-2	29	- .01	- .99	- .84	- .05	-1.25
5-3	28	- .99	- .12	- .67	- .32	.27
5-4	25	3.40	5.33	3.14	2.67	.72
5-5	2[illegible]	- .19	.91	- .81	-2.55	.38
6-1	27	1.94	1.62	- .69	-2.44	- .88
6-2	27	.44	2.46	1.89	1.05	.37
6-3	29	1.05	2.23	- .26	- .23	- .90
6-4	28	- .09	.50	- .52	1.41	.13
7-1	18	1.06	.62	1.19	- .23	-1.26

Table 5.2 (continued)

Teacher	Number of Pupils	Read Comp	Read Vocab	Arith Reason	Arith Conc	Arith Comp
7-2	26	.34	- .36	.62	1.13	.72
7-3	23	-1.80	-1.94	- .77	- .68	-1.05
7-4	25	-1.88	-1.75	- .66	- .63	- .40
8-1	16	-2.28	-1.28	-3.70	-1.25	.70
8-2	22	.30	-1.16	- .98	-1.69	2.90
8-3	18	- .98	- .63	- .34	- .79	.24
8-4	20	- .77	-2.05	.98	.09	.17
9-1	24	.30	-1.00	- .75	- .08	- .76
9-2	27	-1.44	- .36	.68	- .33	.78
9-3	25	.42	-1.01	1.23	1.01	.05
9-4	20	- .37	.29	- .01	.43	-1.97
10-1	23	2.57	2.75	.24	.19	- .32
10-2	26	-1.13	- .65	-1.23	- .76	.04
10-3	25	- .71	-1.10	-1.71	- .85	- .16
10-4	28	1.57	2.84	.67	-1.18	-1.04
11-1	21	- .13	- .71	- .41	.62	2.16
11-2	18	2.70	.90	- .88	1.06	- .78
11-3	19	1.39	1.65	- .31	.72	.06
11-4	20	- .30	.02	1.85	2.45	1.43
12-1	27	- .21	2.11	- .05	1.37	- .34
12-2	29	3.53	3.23	2.82	1.64	1.43
12-3	26	1.30	2.69	.68	.01	1.36
12-4	27	1.94	- .70	1.18	.20	1.76
13-1	26	-1.38	.22	- .10	- .32	2.09
13-2	26	-1.07	.22	.79	2.06	.95

Table 5.2 (continued)

Teacher	Number of Pupils	Read Comp	Read Vocab	Arith Reason	Arith Conc	Arith Comp
13-3	26	.61	-1.59	- .33	- .55	- .16
13-4	26	-1.57	- .79	- .87	- .08	-1.21
14-1	21	-3.72	-4.00	-2.64	-3.17	-1.25
14-2	25	-2.07	-3.20	-1.72	-1.48	-1.67
14-3	26	-4.00	-4.77	-3.11	-2.42	1.12
14-4	25	-2.18	-3.10	- .49	.48	.07
15-1	23	-1.82	1.10	- .35	.40	- .48
15-2	23	-1.14	-2.43	.46	.99	-4.59
15-3	22	- .18	.58	.57	.72	2.65
15-4	20	- .36	.01	2.26	.16	2.86
15-5	24	.20	2.04	1.79	- .86	.24

The data in Table 5.2 show that the amount of gain produced by the different teachers varied considerably across teachers and subject matter areas. The adjusted gain scores should be independent of the pupil's initial knowledge, and his mental ability, because mental ability has been found to be closely related to achievement. Therefore, the gain scores should reflect the teachers' ability as the director of instruction in the five areas under consideration.

6. Analysis of Edwards Personal Preference Schedule Scores

As described in Chapter 2, the Edwards Personal Preference Schedule (EPPS) was administered to the sixty fourth grade teachers who participated in this study. The needs associated with each of the EPPS scores were described in Chapter 3. The EPPS schedule is based upon Murray's (1938) needs theory and attempts to measure normal traits rather than those related to pathology.

The basic assumption for the present research was that the sixty Albuquerque, New Mexico teachers observed in the present study were not essentially different on various measures of noncognitive aspects from elementary school teachers in other schools.

Comparison Between School Systems

As an attempt to test this assumption, the Albuquerque teachers were compared with forty-eight teachers who participated in the Abo project (Cooper, 1964). These teachers taught in grades four through six in Artesia, New Mexico and in two Nevada school systems. The EPPS was administered to these teachers in connection with the Abo project in 1964.

Table 6.1, "Edwards Personal Preference Schedule; Comparison Between School Systems," compares the Albuquerque teachers with the Abo teachers. The means, standard deviations and F score for each of the sixteen EPPS variables is indicated.

Table 6.1

Edwards Personal Preference Schedule
Comparison Between School Systems

Variable	Abo (n=48)	Albuquerque (n-60)	F
Achievement			
M	14.9	13.4	3.42
S.D.	4.3	4.1	
Deference			
M	15.5	14.1	4.37
S.D.	3.0	3.8	
Orderliness			
M	14.1	12.3	3.64
S.D.	5.2	4.6	
Exhibitionism			
M	11.8	12.9	1.62
S.D.	4.3	4.3	
Autonomy			
M	12.4	12.5	0.00
S.D.	3.9	4.2	
Affiliation			
M	16.2	16.5	.18
S.D.	4.1	3.7	
Intraception			
M	15.8	16.5	.81
S.D.	3.7	4.5	
Succorance			
M	10.8	11.5	.61
S.D.	4.1	4.2	
Dominance			
M	14.6	13.4	1.42
S.D.	5.8	4.4	
Abasement			
M	14.2	13.0	1.38
S.D.	4.7	5.5	
Nuturance			
M	15.8	15.7	0.01
S.D.	4.6	5.2	

Table 6.1 (continued)

Variable	Abo (n=48)	Albuquerque (n=60)	F
Change			
M	16.1	18.9	7.47*
S.D.	5.6	5.0	
Endurance			
M	16.9	15.2	3.55
S.D.	4.0	4.8	
Heterosexuality			
M	11.8	12.1	0.01
S.D.	22.3	5.9	
Aggression			
M	14.2	10.7	2.26
S.D.	17.3	4.1	
Consistency			
M	13.0	11.4	1.55
S.D.	10.0	1.9	

* F ratio significant at 1% level

6.1

The table shows, for example, that forty-eight Abo teachers obtained a mean score of 14.9 on the EPPS scale of "achievement." This did not differ significantly from the mean of 13.4 of the Albuquerque teachers. The F of 3.42 lacks statistical significance at the one percent level. We might conclude that the teachers from these school systems answered the questions relating to this scale in much the same way. The standard deviations (S.D.) of 4.3 and 4.1 suggest that variability within the two groups was also comparable.

Table 6.1 reports one significant F ratio at the one percent level. Albuquerque teachers scored higher on the need for "change" than did the Abo group.

It seems reasonable to assume that the sixty Albuquerque teachers observed in the present study were not significantly different on various measures of noncognitive aspects from elementary school teachers in other schools. Although our teacher scores on the EPPS did not completely agree with the EPPS scores of the Abo teachers, this would probably be indicative of a need for more quantitative data on teacher scores on the EPPS.

Comparison with EPPS Norms

The raw score distributions for the Albuquerque teachers were compared with the raw score distributions for adults discussed in the EPPS (1959). In general, no significant differences were noted between the means and standard deviations of both groups.

These data suggest that, except for minor differences, the Albuquerque teachers who participated in this study did not differ greatly in personality aspects from Edwards' general adult sample.

7. The Relationships Between Teacher Behavior and Pupil Achievement

A central issue in this study was to discover whether or not teacher behavior was related to pupil achievement. As described earlier, teacher behavior was measured by an observation schedule, the Teacher Observation Personality Schedule, or TOPS. Pupil achievement was defined as the adjusted class mean gain from fall to spring testing with five subtests of the SRA Achievement Tests: Reading Comprehension, Reading Vocabulary, Arithmetic Reasoning, Arithmetic Concepts and Arithmetic Computation. Each of our sixty teachers were assigned scores for each of the nineteen factors of the TOPS and five gain scores from the achievement tests. These scores were transformed into standard scores (z or T) and were then analyzed by canonical correlation. The actual arithmetic was accomplished via IBM program "BMD06M-Canonical Analysis-Version of Apr. 10, 1964, Health Science Facility, UCLA" on The University of New Mexico's IBM computer 360.

Canonical analysis, it should be recalled, is essentially two things combined: factor analysis and correlation. Factor analyses are made of the two sets of variables, in this case, the adjusted gain scores and the TOPS factor scores. These factors are selected so that the correlation coefficients between sets of factors are at a maximum. The regrouping of scores into the canonical factors is accompanied by weights for each score or factor, similar to the more familiar beta weights resulting from multiple correlation analysis. The interpretation is similar, too: high canonical coefficients attach to those variables which contribute more to the correlation, and low canonical coefficients suggest that a variable is not involved in the prediction. The presentation below shows the values of the canonical correlations, or cc, the canonical coefficients for those variables

which carried the major loadings for prediction and a brief discussion of the possible meaning of the data. The correlations are summarized in Table 7.1.

Table 7.1

Canonical Correlations Between Teachers' Factor Scores from the Teacher Observation Personality Schedule and Adjusted Mean Gains

1. 0.74
2. 0.70
3. 0.63
4. 0.54
5. 0.48

<u>cc 1 = 0.74</u>

Gain Scores: Reading Comprehension = -1.34 Arithmetic Reasoning = .51

TOPS Factors:

1. Classroom management = .41

   (Teacher asks for good conduct; speaks over pupil noise; does not insist that pupils keep desks clear.)

3. Warm, physical support = .34

   (Pupil asks for help and teacher responds immediately; teacher touches pupils; teacher talks to pupil of same sex; teacher works with individual pupil.)

4. Changes room and praises pupil of opposite sex = .48

13. Uses TV, but does not change the bulletin board = .37

15. Group maintenance = -.37

    (Teacher gets board erased; selects a child for a special activity; protects the pupil; apologizes.)

17. Businesslike management of learning = -.47

    (Introduces lesson; does not work at desk or urge completion of tasks.)

According to these data, the teachers who were effective in promoting pupil learning in Arithmetic Reasoning but not in Reading Comprehension were characterized by: asking the pupils for good conduct, touching the pupils, making use of TV, changing the room setting from time to time, working at their desks, responding quickly to pupil requests for help and urging pupils to complete their work. These teachers, typically, did <u>not</u> have the pupils keep clear desks, did <u>not</u>: change their bulletin boards, get the chalk board erased, protect pupils, apologize, or introduce lessons. The reverse was true of those teachers who were more effective in obtaining pupil gains in Reading Comprehension but not in Arithmetic Reasoning. That is, such teachers could be expected to: have the pupils keep clear desks, work in various parts of the room rather than work at their own desks, get the board erased, select children for special work, protect pupils and apologize for an error. But, these teachers would be <u>less</u> likely to: ask for good conduct, speak over pupil noise, respond at once to requests for help, touch pupils, talk to children of the same sex, work with individual pupils, use TV, change the room setting, praise pupils of the opposite sex or urge the children to finish their work. The latter teachers give the aura of being clearly in charge of the situation; orders just don't have to be given; the pupils apparently understand what is expected and react accordingly.

<u>cc 2 = 0.70</u>

Gain Scores: Reading Comprehension = .54 Reading Vocabulary = -1.04

Arithmetic Reasoning = .78 Arithmetic Concepts = .48

TOPS Factors:

4. Changes the room and praises pupil of opposite sex = -.36

6. Group process orientation = -.35

   (Teacher groups class; allows pupils to leave seats without permission; changes from group to individual and back.)

2. Warm, verbal support = .30

   (Teacher calls pupils by endearing terms; uses a visual aid; tells a story; shows affection for children.)

8. Ambivalence = .33

   (Teacher accepts hostility; warns, threatens or punishes; gives in to pupil demands; admits mistakes.)

11. Neatness = .33

   (Visual aids are neat and well organized; teacher emphasizes straightened desks.)

16. Encourages neat work = .32

   (Teacher uses encouraging remarks; stresses neatness; keeps own desk neat.)

Teachers who were successful in developing pupil gains in Reading Comprehension, Arithmetic Reasoning, and Arithmetic Concepts but not Reading Vocabulary tended to: stress neatness, had desks that were well-ordered, admitted errors, gave in to pupil demands, accepted pupil hostility, warned or punished, told stories to the class, used endearing terms and showed affection for the children. These teachers were <u>less</u> likely to: change the room, praise a child of the opposite sex (boys, mostly), use grouping procedures or permit pupils to wander about the room. Again, we can see orderly procedures accompanied by warm expressions and occasional use of punishment.

<u>cc 3 = 0.63</u>

Gain Scores: Arithmetic Reasoning = .94 Arithmetic Concepts = -.97

Arithmetic Computation = -.47

TOPS Factors:

7. Critical punishment vs. courtesy = .60

   (Teacher criticizes pupil of the same sex; uses sarcasm; punishes; is not polite.)

8. Ambivalence = .33

   (Accepts hostility from pupils; warns or punishes pupils of the opposite sex; gives in to pupil demands; admits mistakes.)

11. Neatness = .41

   (Teacher's visual aids are neat and well organized; straightens desks or blinds.)

13. Uses TV but does not change the bulletin board = .43

17. Businesslike management = .47

   (Introduces lesson; does not work at desk or urge completion of a task.)

10. Dominance without concern for pupils' feelings = -.36

   (Teacher orders pupils; ignores or interrupts; calls on non-volunteer.)

12. Group discussion orientation = -.40

   (Teacher encourages group interaction; allows pupils to speak without permission; restates problem to keep discussion to the point.)

The pattern of pupil gains in this canonical correlation shows that teachers who were successful in effecting growth in Arithmetic Reasoning were less effective in the two areas of Arithmetic Concepts and Arithmetic Computation. The teacher behaviors indicative of these kinds of gains were those of: criticizing, discourtesy, ambivalence, stress upon neatness, use of TV, not changing the bulletin board, introducing lessons, accompa-

nied by neglect of group processes and a tendency to respond to pupil inquiries. These teachers were <u>less</u> likely to: order or direct the pupils, ignore pupils or call upon non-volunteers.

<u>cc 4 = 0.54</u>

Gain Scores:	Reading Comprehension =	.51	Arithmetic Computation =	.60
	Reading Vocabulary =	-1.07	Arithmetic Concepts =	-.32

TOPS Factors:

4. Changes the room and praises pupils of opposite sex = .43
7. Critical punishment vs. discourtesy = .33

   (Teacher criticizes pupil of same sex; uses sarcasm; punishes pupil; is discourteous.)
8. Ambivalence = .41

   (Accepts pupil hostility; warns or punishes; gives in to pupil demand; admits mistakes.)
12. Group discussion orientation = .31

    (Teacher encourages group interaction; allows pupils to speak without permission; restates problem to keep discussion to the point.)
15. Group maintenance = .33

    (Teacher gets board erased; selects child for special activity; protects pupil; apologizes.)
5. Organized preparation = -.37

   (Teacher places outline on board; illustrates at board; repeats instructions on assignment; uses progress chart.)
6. Group process orientation = -.31

   (Teacher groups class; allows pupils to leave seats without permission.)

9. Concern with pupil achievement = -.66

(Teacher comments on homework; uses threat to secure improved pupil performance.)

18. Drill, no help outside of class = -.34

(Teacher uses drill; unwilling to help pupil after class.)

In this pattern of pupil gains achieved by our teachers, we can see that gains in Reading Comprehension were associated with gains in Arithmetic Computation, but with lower gains in both Reading Vocabulary and Arithmetic Concepts. Behaviors characteristic of this pattern included those of: changing the room, praising pupils of the opposite sex, using punishment and sarcasm, giving in to pupil demands, admitting mistakes, using group processes, apologizing, and willingness to give help outside of class. These teachers were <u>less</u> likely to: use the chalk board, repeat instructions, group the class for instructional purposes, allow pupils to wander about, comment upon homework, use threats to improve pupil performance, or use drill. These behaviors were associated with teachers who effected gains in Reading Comprehension and Arithmetic Computation but not in Reading Vocabulary and Arithmetic Concepts. If we wished to describe those teachers who secured gains in Reading Vocabulary and Arithmetic Concepts, but not in Reading Comprehension and Arithmetic Computation, then we would need to reverse the descriptions given above.

<u>cc 5 = 0.48</u>

Gain Scores:	Reading Comprehension = -.41	Reading Vocabulary = .61
	Arithmetic Reasoning = .37	Arithmetic Computation = .72

TOPS Factors:

12. Group Discussion orientation = .48

    (Teacher encourages group interaction; allows pupils to speak without permission; restates problem to keep discussion to the point.)

14. Teacher illustrates with map or chart = .49

19. Group approach to pupils of same sex = .66

    (Teacher asks pupils to help each other; praises pupil of same sex; does not interact with pupils of the opposite sex.)

5. Organized preparation = -.32

    (Teacher places outline or questions on the board; illustrates at board; repeats instructions; uses progress chart.)

8. Ambivalence = -.49

    (Teacher accepts hostility from pupil; threatens or punishes pupil of opposite sex; gives in to pupil demand; warns the pupils; admits mistake.)

18. Teacher uses drill exercises, but is unwilling to help after class = -.30

Teachers who were successful in obtaining growth in Reading Vocabulary, Arithmetic Reasoning and Arithmetic Computation were less successful in securing growth in Reading Comprehension. This pattern of pupil gain was characteristic of those teachers who: were willing to help after class, used group discussion techniques, used maps or charts, urged pupils to work with one another, and praised pupils of the same sex (i.e., mostly girls). These teachers were somewhat <u>less</u> likely to: use the chalkboard, repeat instructions, use progress charts, display ambivalent behaviors, or use drill.

Table 7.2

The Teacher Observation Personality Schedule Factors
and the Canonical Correlations in Which They Appeared

TOPS Factor	Canonical Correlation by Number
1. Classroom management.	1
2. Warm verbal support.	2
3. Warm physical support.	1
4. Change room, praise pupil of opposite sex.	1, 2, 4
5. Organized preparation.	4, 5
6. Group process orientation.	2, 4
7. Critical punishment, discourtesy.	3, 4
8. Ambivalence.	2, 3, 4, 5
9. Concern with pupil achievement.	4
10. Dominance without concern for feelings.	3
11. Neatness.	2, 3
12. Group discussion orientation.	3, 4, 5
13. Use TV, don't change bulletin board.	1, 3
14. Use map or chart.	5
15. Group maintenance.	1, 4
16. Encourages neat work.	2
17. Businesslike management.	1, 3
18. Uses drill exercises, gives no help outside of class.	4, 5
19. Group approach to pupils of same sex.	5

Summary of Canonical Analyses

The nineteen TOPS factors and the canonical correlations in which they appeared are presented in Table 7.2. The table shows that TOPS factor eight, "Ambivalence" appeared in four analyses. In canonical correlation two, this factor was positively loaded for Arithmetic Reasoning, Arithmetic Concepts and Reading Comprehension and negatively loaded with Reading Vocabulary. In canonical correlation three, the factor was positively loaded with Arithmetic Reasoning but negative with Arithmetic Concepts and Arithmetic Computation. In cannonical four, Ambivalence was positively weighted with Reading Comprehension and Arithmetic Computation but negatively weighted with Reading Vocabulary and Arithmetic Concepts. Finally, in canonical five, Ambivalence appeared positively with Reading Comprehension, but negatively with Reading Vocabulary, Arithmetic Reasoning and Arithmetic Computation. The moral of this little excursion is simply this: a TOPS factor is neither "good" or "bad" of itself. Whether a given TOPS factor is indicative of teachers who secure above average gains from their pupils depends upon two things: first, the pattern of gains with which we are concerned, and second, the relation of the given TOPS factor with other factors. In a word, these canonical analyses reflect the complexity of the teaching/learning process. There is revealed here no royal road to teaching effectiveness.

Additional light may be shed upon the matter of accounting for achievement gains and classroom behavior by studying Table 7.3, "Correlation Matrix of Adjusted Gain Scores and Teacher Observation Personality Schedule Factors." The table reveals those coefficients which approached the 5% level of significance (for df = 55, 5% r = .26).

Also, correlations that fell between .10 and .17 (plus or minus) are indicated by the sign of the coefficient. Finally, coefficients that fell <u>within</u> plus or minus 0.1 are shown simply by no entry (or a blank space).

Table 7.3

Correlation Matrix of Adjusted Gain Scores and Teacher Observation Personality Schedule Factors

(Notes: N = 60; with 55 df, 5% r = .26, 1% r = .34. A blank or no entry shows that r lies between ± 0.1. A plus or minus sign shows that r is between .1 and .17. Decimals have been omitted.)

	RC	RV	AR	A Con	A Com	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
RC		76	56	30		-35			-36				-29	-20		19	-		+	+	+	18	20	+	RC
RV			57	42	18	-			-32				-29				-		+					20	RV
AR				49	31		23		-30		-19	-	-		-	30		+	26		+			30	AR
ACon					18		23		-25		-18	-	-	24					+		19	-30	+		ACon
ACom												-24	-26	-			+		21					+	ACom
1											20		23	37	+	-	47	-			-25		-22		1
2									+	-20	-25	-36	-		-				+	19	+			22	2
3										22	+						26			23		+		-25	3
4												-34		-21			+	-30				+		-20	4
5															23		+				+	+	-	+	5
6													27		+			-28	-		-19		-	-	6
7													32	+		-			-	-25	-	-20	-19		7
8														41	28		20		-20		-21		-23	-22	8
9															21	-	21	+	-26		-	-	-23		9
10																	29	-	-	21	-	20	+	-	10
11																				+	+			+	11
12																		-		33	-20	21		-29	12
13																				-21	-		+		13
14																									14
15																						+	+	-	15
16																							+	+	16
17																								-	17
18																									18

Reading Comprehension

The table shows that gain in Reading Comprehension covaried with gain in Reading Vocabulary (r = 0.76), Arithmetic Reasoning (r = 0.56), and Arithmetic Concepts (r= 0.30). The table also shows that three of the TOPS factors were negatively related to gain in Reading Comprehension: One - Classroom management (r = -0.35); four - Changes room and praises pupil of opposite sex (r = -0.36); and eight - Ambivalence (r = -0.29). Further, the table shows that there was a tendency for TOPS factors nine (Concern with pupil achievement) and twelve (Group discussion orientation) to covary negatively with gains in Reading Comprehension, and positive covariance tended to appear with gain in Reading Comprehension and TOPS factors eleven (Neatness), fourteen (Use map or chart), fifteen (Group Maintenance), sixteen (Encourage neat work), seventeen (Businesslike management of learning), eighteen (Emphasize drill) and nineteen (Group approach to pupils of the same sex).

According to these data, we could characterize those teachers who were successful in securing pupil gains in Reading Comprehension by the behaviors which they did NOT exhibit. This group of teachers was unlikely: to ask for good conduct, speak over pupil noise, praise pupils of the opposite sex, change the room setting, accept hostility from the pupils, give in to pupil demands, make use of warnings or threats or admit mistakes. They did require that their pupils kept their desks neat. The reverse of these behaviors tended to characterize those teachers who were less successful in effecting pupil gains in Reading Comprehension. That is, the low gain teachers were likely to ask for good conduct, speak over pupil noise, praise pupils of the opposite sex, change the room between observations, accept hostility, warn or threaten, give in to pupil demands and admit mistakes. These behaviors suggest that the effective

teachers (in obtaining gains in reading comprehension) were of the no nonsense sort who maintained discipline without recourse to threats or punishment and were in general command of the situation. When TOPS factors nine (r = -0.20), eleven (r = 0.19), seventeen (r = 0.18), and eighteen (r = 0.20) are considered, we find that the more successful group tended to avoid: comments on homework, using threats to secure improved performance, urging completion of tasks and helping after school. This group was more likely to: possess neat visual aids, straighten the blinds, introduce the lesson and make limited use of drill. The impression is strengthened that these more successful teachers went about their teaching with a calm, businesslike approach which involved neither threats nor cajolery. The less effective teachers did resort to warnings and praise; this failed to produce pupil gains in reading comprehension.

Reading Vo ulary

The data in Table 7.3 show that gain in Reading Vocabulary was related to gains in Reading Comprehension (r = .76), Arithmetic Reasoning (r = .57), and Arithmetic Concepts (r = .42). Two TOPS factors contributed to the variance, factor four, "Changes room between observations," and factor eight, "Ambivalence." To a lesser degree, factor nineteen, "Group approach to pupils of the same sex," was involved. The respective correlation coefficients were -.32, -.28, and .20.

The teacher behaviors indicative of gain in vocabulary included: asking pupils to help each other, praising pupils of their own sex and avoiding interaction with pupils of the opposite sex. These teachers were less likely to: praise pupils of the opposite sex or change the room between observations. Nor were they teachers who would accept hostility from pupils, warn or threaten, give in to pupil demands, or admit mistakes.

Conversely, teachers who were less successful in effecting mean gain in vocabulary could be counted upon to: accept hostility from pupils, to warn or threaten the children, give in to pupil demands, admit mistakes, praise those of the opposite sex and change the room setting between observations. This low gain group would probably (the caveat is due to the low r of .20) interact with pupils of the opposite sex but would not ask pupils to help each othe or praise pupils of the same sex.

It is noteworthy that many of the behaviors which were associated with achieving gain in reading comprehension also were related to obtaining gain in vocabulary. That is, TOPS factors four and eight were both negatively related to pupil gain. These two factors are four; Changes room and praises pupil of opposite sex; and eight; Ambivalence. The behaviors described in these two factors apparently are ones to avoid if the goal is pupil gains in reading comprehension and vocabulary.

Arithmetic Reasoning

Teachers who secured gain in Arithmetic Reasoning also had a tendency to obtain gains in Reading Comprehension (r = .56), Reading Vocabulary (r = .57), Arithmetic Concepts (r = .49), and to a lesser extent, Arthmetic Computation (r = .31). Four TOPS factors covaried with gain in reasoning at the 5% level of significance. They were: Four - Changes room between observations and praises pupils of opposite sex (r = -.30); eleven - Neatness (r = .30); fourteen - Uses map or chart (r = .26); and nineteen - Group approach to pupils of opposite sex (r = .30). Less substantial correlations were noted between gain in reasoning and TOPS factors two - Warm verbal support (r = .23) and six - Group process orientation (r = -.19).

The principle behaviors exhibited by the teachers whose pupils showed

gain in Arithmetic Reasoning included the following: have neat visual aids, straighten the blinds, use maps or charts, ask pupils to help each other, praise pupils of both sexes but leave the room unchanged and avoid interacting with pupils of the opposite sex. To a lesser extent, we would probably see warm verbal support exhibited by calling pupils by endearing terms, story telling, using visual aids, and demonstrating affection for the children. Grouping probably would be less evident, and pupils would be unlikely to leave their seats without permission.

As in the former two analyses, these behaviors would appear in the reverse for those teachers who were less successful in securing gain in Arithmetic Reasoning.

Arithmetic Concepts

The TOPS was relatively ineffective in predicting success in Arithmetic Concepts gains; only one factor's correlation was significant at the 5% level. Five factors "almost" came through; these coefficients varied from .18 to .25 (absolute values). Gains in Arithmetic Concepts correlated .30 with gains in Reading Comprehension, .42 with gains in Reading Vocabulary, .49 with gains in Arithmetic Reasoning and .18 with gains in Arithmetic Computation. TOPS factor seventeen correlated -.30 with gain in Arithmetic Concepts. Teachers who worked at their desks, urged completion of work, but who did not typically introduce the lesson were those who achieved this kind of arithmetic gain. There was a tendency among these teachers to exhibit the following behaviors: use endearing terms with pupils, use visual aids, show affection, tell stories (factor two, $r = .23$); comment on homework, use threats to secure improved pupil performance (factor nine, $r = .24$); use encouraging remarks, stress neat-

ness (factor sixteen, r = .19). This group was <u>less</u> likely to : praise pupils of the opposite sex or change the room between observations (factor four, r = -.25); group the class or allow pupils to leave their seats without permission (factor six, r = -.18). These interpretations are advanced as tentative suggestions; most of the underlying correlation coefficients failed to reach statistical significance.

Arithmetic Computation

The TOPS records did not assess this domain very well. Only one factor was significantly related to gain; two others were on the periphery. Factor eight, "Ambivalence," correlated -.26 with gain. Therefore, <u>low</u> gain teachers were characterized by accepting pupil hostility, warning or threatening, giving in to pupil demands and admitting mistakes. Less pronounced were such behaviors as criticizing, sarcasm, punishment and discourtesy (factor seven, r = -.24), and an avoidance of maps and charts (factor fourteen, r = .21).

Summary

The data presented thus far suggest that there were no patterns of behavior that yielded consistent results for all five areas of adjusted pupil gain. However, those behaviors which were thought to reflect the underlying need for abasement seemed to appear as negatively associated with pupil gains. In particular, the following behaviors were often associated with those teachers who were less effective in obtaining pupil gain: praise pupils, change the room setting between observations, give in to pupil demands, accept hostility from the children, warn or threaten, admit mistakes and interact with pupils of the opposite sex. Teachers who adopt these kinds of behaviors are likely to have noisy, rather dis-

ordered classrooms. Every now and then, the commotion gets to be too much, the teacher reacts aggressively and puts the fire out. But only temporarily. Soon, the cycle starts again. And, the pupils do not seem to learn so well under these conditions.

8. Relations Between Teachers' Scores on the Edwards Personal Preference Schedule and Teacher Classroom Behavior

The prediction of behavior has long been of concern, not only to educators, but to psychologists and students of behavior in general. A focus of the present investigation was that of examining the relations, if any, between our teachers' scores on the Edwards Personal Preference Schedule (EPPS) and their classroom behavior as recorded by trained observers using the Teacher Observation Personality Schedule (TOPS). The relations were explored by canonical analysis and by zero order correlations.

The canonical analysis yielded thirteen coefficients equal to or greater than .3, as disclosed in Table 8.1

Table 8.1

Canonical Correlations Between EPPS and TOPS

1.	0.87
2.	0.85
3.	0.76
4.	0.71
5.	0.70
6.	0.63
7.	0.60
8.	0.56
9.	0.51
10.	0.47
11.	0.36
12.	0.33
13.	0.30

Detailed analysis and discussion are presented for correlations one through ten; these ten account for the bulk of the variance. The discussion presents the value of the canonical correlation (cc), the factor loadings for the TOPS and the comparable loadings for the EPPS scales involved.

<u>cc 1 = 0.87</u>

EPPS: Deference = .41 Intraception = -.41 Abasement = -.41

Nurturance = -.89 Endurance = -.98 Aggression = -.54

Heterosexuality = -.43

TOPS factors:

4. Changes room and praises pupil of opposite sex = .56

8. Ambivalence = -.45

9. Concern with pupil achievement = .34

14. Uses maps and charts = -.35

Because of the many negative weights reported for the EPPS, the discussion is based upon reversing all signs. Thus, we can expect that our teachers who scored <u>high</u> in intraception, abasement, nurturance, endurance, aggression and heterosexuality, but <u>low</u> in deference, were those who were more likely to use charts and maps, accept hostility from the pupils, warn or threaten, give in to pupil demands, admit mistakes, regrain from changing the room, and <u>less</u> likely to praise pupils of the opposite sex, comment on homework, or use threats to secure improved pupil performance.

<u>cc 2 = 0.85</u>

EPPS: Orderliness = -.86 Nurturance = -.59 Change = -.41

Heterosexuality = -.47 Aggression = -.37

TOPS factors:

7. Critical punishment vs. courtesy = -.42

8. Ambivalence = .76

10. Dominance without concern for feelings = -.41

19. Group approach to pupils of same sex = .44

Teachers who scored low on the EPPS scales of orderliness, nurturance, change, heterosexuality and aggression tended to criticize or correct pupils of the same sex, use sarcasm, punishment, be discourteous, accept pupils' hostility, warn or threaten, give in to pupil demands, admit mistakes, ask pupils to help each other, and praise pupils of the same sex. These teachers would be <u>less</u> likely to interact with pupils of the opposite sex, direct, ignore, interrupt, or call on a non-volunteer.

<u>cc 3 = 0.76</u>

EPPS: Achievement = .48 Exhibitionism = -.48 Aggression = -.42

Heterosexuality = .46 Consistency = -.53

TOPS factors:

3. Warm physical support = .59
6. Group process orientation = .34
7. Critical punishment vs. discourtesy = -.61

In our sample of teachers, those whose EPPS profiles were elevated in achievement and heterosexuality, but depressed in exhibitionism, aggression and consistency were likely to be observed in the classroom responding at once to pupil calls for assistance, touching pupils, working with individual children, talking with pupils of the same sex, grouping the class, moving from individual to group activity, allowing pupils to leave their seats without permission and showing courtesy. This group would probably be less inclined to punish, use sarcasm or criticize pupils of the same sex.

cc 4 = 0.71

EPPS: Deference = .71 Succorance = -.60 Abasement = -.32

Heterosexuality = .42

TOPS factors:

7. Critical punishment vs. courtesy = -.38

8. Ambivalence = -.32

10. Dominance without concern for feelings = .32

12. Group discussion orientation = .37

13. Uses TV, but doesn't change bulletin board = .70

18. Drill; no help outside of class = -.55

Teachers who scored high on the two EPPS scales of deference and heterosexuality, but low in succorance and abasement, were likely to order the pupils, ignore or interrupt pupils, call on non-volunteers, use TV, refrain from changing the bulletin board, encourage group interaction, allow children to speak without permission, restate a problem in order to keep the discussion to the point, and help after class. These teachers would be less likely to criticize or correct pupils of the opposite sex, warn or threaten, give in to pupil demands, be discourteous, accept hostility, admit mistakes or use drill.

cc 5 = 0.70

EPPS: Autonomy = -.54 Affiliation = .68 Intraception = -.43

Succorance = -.58 Abasement = -.45 Endurance = -.34

TOPS factors:

7. Critical punishment vs. courtesy = -.47

14. Uses maps, charts = .39

17. Business like management of learning = -.58

Teachers whose EPPS scores were low in affiliation, but high in autonomy, intraception, succorance, abasement and endurance were found typically avoiding the use of maps and charts, criticizing or correcting pupils of the opposite sex, being sarcastic, discourteous, applying punishment, introducing lessons and working about the classroom. We would not expect to find these teachers urging the completion of tasks.

<u>cc 6 = 0.63</u>

EPPS: Orderliness = -.59 Abasement = -.94 Change = -.72
Heterosexuality = -.66 Consistency = -.42 Aggression = -.62

TOPS factors:

6. Group process orientation = -.39
9. Concern with pupil achievement = .45
10. Dominance without concern for pupil feelings = -.62
18. Drill; no help outside of class = .43

Teachers obtaining high scores on the EPPS scales of orderliness, abasement, change, heterosexuality, consistency and aggression tended to group their classes, allow pupils to leave their seats without permission, change from individual to group activities, direct the pupils, ignore or interrupt, call on non-volunteers and help outside of class. We would be less likely to find these teachers commenting on homework, using threats to secure improved performance, or using drills.

cc 7 = 0.60

EPPS: Intraception = .40 Succorance = .42 Heterosexuality = .44

Aggression = .69

TOPS factors:

3. Warm physical support = .34
9. Concern with pupil achievement = .38
11. Neatness = -.55
14. Use maps or charts = .48
15. Group maintenance = .36

High scores in the EPPS needs for intraception, succorance, heterosexuality and aggression seemed to dispose our teachers toward giving help as soon as requested, touching pupils, talking to pupils of the same sex, working with individual children, commenting on homework, using threats to secure improved performance, using maps or charts, getting the board erased, selecting children for special activities, protecting children, apologizing, being somewhat disorderly in their visual aids, and ignoring crooked blinds or desks.

cc 8 = 0.56

EPPS: Achievement = .34 Dominance = .37 Nurturance = .44

Endurance = -.47 Aggression = -.62 Consistency = .35

TOPS factors:

2. Warm verbal support = -.51
5. Organized preparation = -.48
9. Concern with pupil achievement = .48
10. Dominance without regard for feelings = .36
12. Group discussion orientation = .40
15. Group maintenance = -.46

Those of our teachers who possessed high EPPS scores in achievement, dominance, nurturance and consistency combined with low scores in endurance and aggression tended to comment on homework, use threats to secure improved pupil performance, command or direct the pupils, ignore or interrupt, call on non-volunteers, encourage group interaction, allow pupils to leave seats without permission, and restate problems to keep discussions to the point. Such teachers, however, were <u>less</u> likely to use endearing terms, use visual aids, tell stories, show affection for children, place an outline on the board, repeat an assignment, use progress charts, get the board erased, select children for special activities, protect children or apologize.

<u>cc 9 = 0.51</u>

EPPS: Orderliness = -.45 Autonomy = -.62 Nurturance = -.89

Endurance = .38 Consistency = .44

TOPS factors:

2. Warm verbal support = -.86

8. Ambivalence = -.36

11. Neatness = -.30

19. Group approach to pupils of same sex = .33

Our ninth canonical correlation suggests that teachers who scored high in the EPPS needs for endurance and who had a high consistency score, accompanied with low scores in orderliness, autonomy and nurturance, exhibited the classroom behaviors of asking pupils to help each other and praising pupils of the same sex. On the other hand, these teachers were <u>unlikely</u> to use endearing terms, use visual aids, tell stories, show affection, accept hostility, warn or threaten, give in to pupil demands, admit mistakes or be neat.

cc 10 = 0.47

EPPS: Orderliness = .40 Exhibitionism = .44 Intraception = .38

Dominance = -.37 Heterosexuality = -.33

TOPS factors:

3. Warm physical acceptance = .51
7. Critical punishment vs. courtesy = .36
10. Dominance without feeling for others = .46
15. Group maintenance = -.56
16. Encourages neat work = .38

The final canonical analysis indicates that those teachers whose EPPS profiles were elevated in orderliness, exhibitionism and intraception, but depressed in dominance and heterosexuality, were likely to give help as soon as requested, touch pupils, talk with children of the same sex, work with individuals, criticize pupils of the same sex, use sarcasm, punish, show discourtesy, command and call on non-volunteers. Less probable were these behaviors: get the board erased, select child for special activity, protect a child, apologize, encourage a child and stress neatness.

Analysis of Intercorrelations Between TOPS and EPPS

The correlation matrix between TOPS and EPPS scores is presented in Table 8.2. A correlation coefficient must equal at least .26 to reach the five percent level of significance. The table lists those coefficients which were .18 or above. Part I of the table presents the correlations among the sixteen EPPS scores and the nineteen TOPS factors. The table reveals that the EPPS scores in general were not closely related to the teachers classroom behaviors as measured by our TOPS. On the other hand, a number of significant relations did appear, suggesting that the EPPS is capable of predicting a limited amount of teacher behavior.

Table 8.2

Correlation Matrix for EPPS vs. TOPS
(N = 60. Only r = .26 or above reported)
Part I: EPPS

	ACH	DEF	ORD	EXH	AUT	AFF	INT	SUC	DOM	ABA	NUR	CHG	END	HET	AGG	CON	
ACH		06	06			-19	-25			-26	-31				18		ACH
DEF			28	-35	-22							-22	27	-48			DEF
ORD				-32	-22	-23						-17	49	-25			ORD
EXH										-21	-37		-44	20	22		EXH
AUT							-35				-21		-32	41			AUT
AFF										26	38				-39		AFF
INT								-35		-18			24	-23			INT
SUC													-32		-43	23	SUC
DOM											-19					-19	DOM
ABA											35	-18		-22	-19		ABA
NUR												-21		-28	-40	19	NUR
CHG																	CHG
END														-40			END
HET																	HET
AGG																-27	AGG
CON																	CON
1			-21											20			1
2					21		-18						-23		23	-18	2
3			25		-23							-27					3
4							-18	18					-37				4
5						-20	28	-19		-19			31		19		5
6										29							6
7				18												23	7
8	-22		-31							36	35						8
9			-22	21		-20				-21							9
10											22						10
11	25		20				-18						19				11
12						-26								19			12
13		19					24	-19				-25	20				13
14		-25			-21										32		14
15		-23				-20					-22			35			15
16	20		25			-18					-31						16
17		18	19			-19		19		19							17
18		-18	22														18
19						20											19

Table 8.2 Continued

Part II: TOPS

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1					20		23	37			47				-25		-22	
2				-20	-25	-36								19				22
3				22							26			23				-25
4						-34		-21				-30						-20
5									23									
6							27					-28			-19			
7							32							-25		-20	-19	
8								41	28		20		-20		-21		-23	-22
9									21		21		-26				-23	
10											30			21		20		
*11																		
12														33	-20	21		-29
13														-21				
14																		
15																		
16																		
17																		
18																		

*The item correlated with no TOPS factor

The EPPS intercorrelations were discussed earlier (see Chapter 6). The following remarks concern the EPPS and its relations to the TOPS.

The need for orderliness correlated -.31 with TOPS factor eight, "Ambivalence." This suggests a tendency for low order teachers to accept pupil hostility, warn or threaten, give in to pupil demands, and admit mistakes. Low scores in affiliation were accompanied by tendencies toward group discussion orientation (r = -.26). High intraception scores were predictive of organized preparation (TOPS factor five; r = .28). High scores in abasement tended to identify teachers who obtained higher scores in TOPS factors seven, "Critical punishment vs. courtesy" (r = .29) and eight, "Ambivalence" (r = .36). High scores in abasement tended to predict behaviors such as being critical, sarcastic, using punishment, being discourteous, accepting pupil hostility, giving in to pupil demands, and admitting mistakes.

High scores in the need for nurturance were accompanied by high scores in TOPS factor eight, "Ambivalence" (r = .35), but low scores in factor sixteen, "Encourages neat work" (r = -.31). On an a priori basis, one might have expected nurturance to be found in more compassionate company, like TOPS factors two and three, warm, supportive kinds of behaviors.

Elevated scores in the need for change were accompanied by low scores in TOPS factor three, "Warm physical support" (r = -.27). That is, the higher scoring teachers would be less likely to respond to requests for help immediately, touch pupils, or talk to pupils of the opposite sex.

The need for endurance was related to two factors, factor four, "Change room and praise pupils of opposite sex" (r = -.37), and factor five, "Organized preparation" (r = .31). High scoring teachers might be expected to place outlines on the board, illustrate at the board, repeat assignments, and use progress charts. They would be less likely to praise pupils of

the opposite sex or change their rooms between observations.

The need for heterosexuality correlated .35 with factor fifteen, "Group maintenance." We would expect to find teachers with higher scores on this EPPS scale getting the board erased, selecting pupils for special activities, protecting pupils and apologizing.

The need for aggression correlated .32 with factor fourteen. So, we might conclude that teachers who chose aggressive responses in the EPPS would be likely to illustrate with maps or charts.

Summary

The Edwards Personal Preference Schedule did account for much of observed teacher behavior as recorded by trained observers using the Teacher Observation Personality Schedule. This is seen most clearly in the canonical analyses, but less clearly in the zero-order correlations. The former takes into account the cumulative effects of small correlations, much in the manner that multiple regression analysis permits us to use larger portions of the data than customarily afforded by zero-order analysis.

9. Predicting Pupil Gain From the Teachers' Edwards Personal Preference Schedule Scores

As described earlier, each teacher's Edwards Personal Preference Scale (EPPS) scores were transformed to "z" scores. Similarly, each teacher's five gain scores were transformed into "T" scores. The five gain scores were those produced by the SRA Achievement Series, Forms C and D, Blue Level, in the areas of Reading Comprehension (RC), Reading Vocabulary (RV), Arithmetic Reasoning (AR), Arithmetic Concepts (ACon), and Arithmetic Computation (ACom), Thorpe, et al (1964). The sixteen EPPS scores and the five gain scores were analyzed with canonical correlation in order to determine whether or not the EPPS scores detected those teachers whose pupils made greater or lesser gains in school achievement. As noted below, pupil gain is indeed a partial function of the teacher's EPPS profile. The data report the value of the obtained canonical correlation (cc) and the canonical coefficients for the gain scores and for the EPPS scores. The correlations are summarized in Table 9.1.

cc 1 = 0.75

Gain: Reading Comprehension = -.32 Reading Vocabulary = .35

Arithmetic Concepts = -1.14

EPPS: Intraception = .54 Succorance = .72 Abasement = .63

Nurturance = -.55 Heterosexuality = .41

The first set of factors obtained by the canonical analysis included a heavy, negative weighting for gain in Arithmetic Concepts, accompanied by lower weights in Reading Comprehension (-.32) and Reading Vocabulary (.35). This pattern of achievement growth was obtained by teachers who scored high in the EPPS scales of Intraception, Succorance, Abasement, and

Table 9.1

Canonical Correlations Between Edwards Personal Preference Schedule Scores and Adjusted Mean Gains

1. 0.73
2. 0.58
3. 0.50
4. 0.46
5. 0.30

Heterosexuality, but low in the need for Nurturance. We would expect this group of teachers to be concerned with analyzing motives, trying to predict behavior, receiving affection from others, being timid in the presence of authorities, enjoying members of the opposite sex but less interested in showing affection or in helping others.

cc 2 = 0.58

Gain: Reading Comprehension = -.44 Arithmetic Reasoning = -.77
Arithmetic Concepts = .31

EPPS: Achievement = .56 Deference = .73 Affiliation = .42
Nurturance = .40 Change = .34 Heterosexuality = .85
Consistency = .72

Since two of the three weights for gain are negative, the following discussion is based upon reversed signs. Thus, the second canonical factor of gains shows high gains in Reading Comprehension and Arithmetic Reasoning coupled with somewhat (the weight of .31 is low) lower gain in Arithmetic Concepts. The EPPS scores of these teachers suggest that, as a group, they are not driven by the need to be successful. Possessing friends is not seen as critical, new ideas or fads are not very attractive, nor is getting suggestions from others. Conventionality possesses value. Showing affection for others would be uncharacteristic, as would be participating in activities with members of the opposite sex. These teachers tended to react to the EPPS items in an inconsistent manner. In a word, this group might be described as non-committed, rather prosaic and conventional. And, this personality pattern seemed effective in promoting pupil gain in Reading Comprehension and Arithmetic Reasoning but not so much in Arithmetic Concepts.

<u>cc 3 = 0.50</u>

Gain: Reading Comprehension = 1.01   Reading Vocabulary = -1.20

Arithmetic Computation = -.51

EPPS: Achievement = -.35   Exhibitionism = .44   Intraception = -.73

Dominance = -.34   Nurturance = .31   Endurance = .48

Aggression = -.48

Our third canonical gain factor combined Reading Vocabulary with Arithmetic Computation with opposite loading on Reading Comprehension. Seven EPPS scales combined in the accompanying factor. Consequently, we may conclude that teachers who effected pupil gains in Reading Vocabulary and Arithmetic Computation, but not in Reading Comprehension, reflected the following personality pattern: enjoy doing a difficult job well, observe and predict the behavior of others, be critical, be a leader, but <u>less</u> inclined toward helping others, being the center of attention, or working hard on a job until the work is finished. There seems to be some conflict here between the weightings on the EPPS scales of Achievement (-.35) and Endurance (.48).

<u>cc 4 = 0.46</u>

Gain: Reading Comprehension = .57   Reading Vocabulary = .66

Arithmetic Reasoning = -1.06

EPPS: Deference = -.32   Autonomy = -.58   Intraception = -.40

Succorance = -.33   Nurturance = -.91   Consistency = .45

Our fourth canonical gain factor combined positively gains in Reading Comprehension and Reading Vocabulary, with negative loading on gain in Arithmetic Reasoning. Five EPPS scales were combined into a related factor; Each of these scales was negatively loaded (Consistency is not, properly

speaking, an EPPS scale). Thus, these teachers who were effective in teaching reading, but less effective in teaching Arithmetic Reasoning possessed the following personal traits: conventional, unconcerned about the motivation of others, accept responsibility, avoid both giving and receiving affection. Again, this seems to describe an individual who is emotionally non-committed, but who acts and behaves in a responsible manner.

cc 5 = 0.30

Gain: Reading Comprehension = .96 Reading Vocabulary = -.83

Arithmetic Reasoning = -.33 Arithmetic Computation = .91

EPPS: Deference = -.40 Succorance = .89 Dominance = .39

Abasement = -.34 Endurance = .42

This analysis is presented for the sake of completeness. The obtained canonical correlation is so low that interpretations of the factors and their loadings could be misleading.

Zero-Order Correlations

The zero-order correlations between the EPPS scales and the adjusted mean gains are disclosed in Table 9.2. The table shows that most of the correlations between EPPS scales and the teachers' adjusted gain scores were low and lacked statistical significance. The low correlation coefficients show that no single EPPS scale could be relied upon to identify those teachers who were more likely to produce gains among their pupils. Excluding the Consistency score, only two EPPS scales correlated significantly with pupil gain. They were the need for Aggression, which correlated .29 with gain in Arithmetic Concepts and .29 with gain in Reading Vocabulary, and the need for Succorance correlated -.42 with

gain in Arithmetic Concepts. It should also be noted that the fifteen EPPS scales and the five gain scores yielded seventy-five correlation coefficients. By pure chance, we would expect to find .05 x 75 or 3.75 of these coefficients reaching the five percent level of significance by chance and chance alone.

Table 9.2*

Correlation Matrix between Edwards Personal Preference Schedule and Adjusted Mean Gains From the SRA Achievement Tests
(N = 60)

	RV	AR	ACon	ACom	ACH	DEF	ORD	EXH	AUT	AFF	INT	SUC	DOM	ABA	NUR	CHG	END	HET	AGG	CON
RC	76	56	30	09	02	-17	19	08	-17	-13	02	-13	06	-03	-14	02	16	-15	13	-24
RV		57	42	18	05	-17	09	10	-16	-11	11	-22	12	00	-24	03	00	-08	29	-31
AR			49	31	-05	-17	04	16	-04	-07	11	-06	12	-05	00	-05	-09	-10	14	-39
ACon				18	16	-11	07	-04	-11	-06	05	-42	24	-23	10	13	02	-17	29	-20
ACom					08	-09	-05	04	-02	-06	13	07	18	-16	-09	-04	-11	05	16	-07

* Note: For df = 55, 5% r = .26; 1% r = .34

Decimals have been omitted in this table.

10. Teacher Attitudes

Although research on teacher personality has been carried on for half a century, research dealing with the effect of an observer on classroom climate is rare. That is--what effect does the presence of an observer have on teacher classroom behavior and pupil classroom behavior? It would seem that the most reliable information on this would come not from the observer, not from the observed pupil--but from the observed teacher.

Medley and Mitzel (1963) state, "It seems reasonable to assume that, particularly, if proper precautions are taken, the resemblance between a classroom with a single observer present and one with no observer present is closer than that between either the test situation or the laboratory situation on the one hand, and a life situation on the other. Nonetheless, whatever can be done to minimize the disturbing effect of the observer should be done."

At the close of the present study, a questionnaire was sent to the participating teachers. They were asked to give their opinions concerning the effect of classroom observers on pupil and teacher behavior. They were told that a criticism sometimes made of measurements based on direct observations is that they lack validity, because the behaviors are not representative of normal classroom behavior, and the teachers were asked to express their opinions on this. A stamped self-addressed envelope was included with the questionnaire, and the teachers were informed that they need not sign the questionnaire.

Fifty-three of the sixty teachers who participated in this study completed and returned their questionnaires. Table 10.1 indicates the teacher responses to the eight questions which were asked. This table shows that the majority of the teachers did not believe the presence of the

observer affected either pupil or teacher behavior. In those instances where the teachers responded that they felt the presence of the observer affected the pupil behavior, at first, the teachers noted that this effect seemed to decline after the observer had visited the classroom several times.

Each teacher knew she would be observed at least nine times during the semester but was not notified in advance of the exact date and time of the observation. A majority of the teachers reported that they would prefer not to know in advance when an observer intended to observe the classroom.

A gratifying response accompanied the question, "Would you participate in such a study again?" Forty-two of the fifty-three teachers who returned questionnaires reported that they would be willing to participate in such research again.

Many of the questionnaires included requests by the teachers for information about the results of the study. The following two comments are typical of those made by the teachers.

"While an observer does not disturb me, I do not think I am quite the same as when I am alone. I am more casual, tease, and friendlier when there is no observer, usually. If my participation in the study helped promote professional proficiency, then I am happy to have been a part in the project." (teacher comment)

"Your observers were so unobtrusive that one was able to forget their presence very quickly. After all, concentration on twenty-eight other individuals occupies most of the mind.

"We all hope that if you find anything of value, you will let us in on it." (teacher comment)

Does an observer in a classroom produce an effect on teacher-pupil behavior? Seventy percent of the teachers in the present study reported

that they were not disturbed by the observers being present in the classroom. More than seventy percent of the teachers also believed that the observers did not affect the pupils' classroom behavior.

This would lead to the conclusion that the classroom behaviors witnessed by the observers in the present research closely resembled the classroom behaviors which go on when no visitor is present in the classroom.

Table 10.1

Response to Teacher Questionnaire of January, 1967 (N=53)

Fifty-three teachers responded to the questionnaire as follows:

1. Do you believe observers in your classroom constitute an invasion of your privacy?

Response	
Yes	No
3	50

2. Did the presence of the observer disturb you?

Yes	No
10	43

3. Do you believe the presence of the observer disturbed your pupils to such a degree that it affected their classroom behavior?

Yes	No
8	45

4. Did this effect seem to decline after the observer had observed several times? (This question responded to by teachers who answered yes to question 3.)

Yes	No
6	2

5. Would you prefer to be informed of each visit in advance?

Yes	No
13	40

6. Did you feel more comfortable about the observer's presence after she had visited several times?

Yes	No	Never Felt Uncomfortable
42	5	6

7. Do you believe information derived from classroom observation can be of possible significance?

Yes	No	Maybe
35	9	9

8. Would you participate in such a study again?

Yes	No
42	11

11. Discussion of Findings

The primary findings were reported in chapters seven, eight and nine. These sections showed that the relations between various sets of variables were complex, that no single score or set of scores predicted pupil achievement or teacher behavior. Several approaches to clarifying the impact of our data are essayed in this portion of the report.

Predicting Pupil Gain from Teacher Behavior

The various relations between canonical factors of teacher behavior and adjusted pupil gain were presented in chapter seven. These data were re-examined according to the format, "To what extent did each TOPS factor score enter into the prediction of pupil gains?" A table of signs was prepared showing the influence of each TOPS factor as it appeared in each canonical correlation. This summary is presented in Table 11.1, "Signs of Weights of TOPS Factors and Pupil Gain."

Table 11.1

Signs of Weights of TOPS Factors and Pupil Gain

Number of TOPS Factor	RC	RV	Adjusted Pupil Gain* AR	AConc.	AComp.
1	+	0	-	0	0
2	+	-	+	+	0
3	+	-	0	0	0
4	+ + -	+ -	- -	- -	+
5	- +	- +	-	+	- -
6	- -	+ +	-	- +	-
7	0	0	+	-	-
8	+ +	- -	+ +	+ - -	- +
9	-	+	0	+	-
10	0	0	-	+	+
11	+	-	+ +	+ -	-
12	+ -	- +	- +	+ -	+ + +
13	+	-	+	-	-
14	-	+	+	0	+
15	- +	+ -	0	-	+
16	+	-	+	+	0
17	-	+	+	-	-
18	- +	+ -	-	+	- -
19	-	+	+	0	+

* RC = Reading Comprehension; RV = Reading Vocabulary; AR = Arithmetic Reasoning; AConc = Arithmetic Concepts; AComp = Arithmetic Computation

The table shows the signs of the weights assigned to each TOPS factor as they appeared in the canonical analysis for pupil gain. For example, TOPS factor one is seen to have appeared with a positive (+) weight in Reading Comprehension, not involved (0) with Reading Vocabulary, negative with Arithmetic Reasoning (-) and not involved with predicting Arithmetic Concepts (0) or Arithmetic Computation (0). By looking at each of the five areas of pupil gain, we can begin to note which patterns of teacher behavior promoted gain, as evidenced by "+" signs, which behaviors were detrimental, as noted by "-" signs, which behaviors were not involved, and those behaviors which yielded ambiguous results according to the presence of both plus and minus signs.

Reading Comprehension seemed to prosper when teachers used the behaviors implied in TOPS factors one, two, three, eight, eleven, thirteen and sixteen. Negative influences were found from TOPS behaviors nine, fourteen, seventeen and nineteen. Ambiguous interpretations must be accorded TOPS behaviors four, five, twelve, fifteen and eighteen. TOPS factors seven and ten were not involved. Consequently, one might say that the following behaviors tended to <u>favor</u> pupil gains in Reading Comprehension: teacher asks for good conduct, speaks over pupil noise, uses endearing terms, demonstrates, uses visual aids, reads or tells stories, shows affection, responds to pupil requests at once, touches pupils, works with individuals, talks to pupils of own sex, accepts hostility from pupils, warns or threatens pupils, gives in to pupil demand, admits mistakes, is neat, uses TV, leaves room unchanged, uses encouraging remarks, and stresses neatness. Gains in Reading Comprehension were <u>less</u> likely to appear when the teachers commented on homework, used threats to secure improved performance, illustrated with maps or charts, insisted

that pupils keep their desks clear, introduced lessons, worked away from their desks, asked pupils to help each other, praised pupils of the same sex, or avoided interacting with pupils of the opposite sex. The more successful teachers were those who exuded considerable warmth and interaction with the pupils of the opposite sex. This teacher looks like the warm, friendly aunt, who is not overly rigid and dominant.

Reading Vocabulary gains did not present as clear a picture, in-as-much as many of the TOPS factors weighted negatively. The five factors with positive loadings (six, nine, fourteen, seventeen and nineteen) included such behaviors as: teacher groups class, allows pupils to leave seats without permission, changes from individual work to group work, comments on homework, uses threats to secure improved performance, illustrates at map or chart, introduces the lesson, asks pupils to help each other, praises pupils of the same sex, and changes the bulletin board. Gains in Reading Vocabulary were <u>less</u> likely to occur in the presence of such teacher behaviors as: using endearing terms, demonstrating or showing affection, using physical supportive measures, accepting pupil objections, warning or threatening pupils, giving in to pupil demands, admitting mistakes, stressing a neat classroom, using TV or radio, using encouraging remarks, or stressing form. It can be seen that the behaviors associated with gains in Reading Comprehension were different from those associated with gain in Reading Vocabulary. To get across vocabulary, the teacher was somewhat less warm, less inclined to interact with the pupils on a personal basis.

Table 11.1 shows that gains in Arithmetic Reasoning were accompanied by positive weights for TOPS factors two, seven, eight, eleven, thirteen, fourteen, sixteen, seventeen and nineteen. Negative weights are recorded

for TOPS factors one, four, five, six, ten and eighteen. Consequently, we would expect these gains to occur when the teacher: called pupils honey or other endearing term, demonstrated or used a visual aid, told a story, showed affection for the children, corrected pupils of the same sex, used sarcasm, punished pupils, was discourteous, accepted hostility, warned, gave in to pupil demands, admitted mistakes, was neat, used TV or radio, left the bulletin board unchanged, illustrated with a map or chart, used encouraging remarks, introduced lessons, worked around the room, praised pupils of same sex, asked pupils to help each other, helped after class, and insisted that desks be kept clear. These teachers were <u>less</u> likely to: interact with pupils of the opposite sex, praise pupils of the opposite sex, urge completion of a task, ask for good conduct, speak over pupil noise, place an outline on the board, illustrate at the board, repeat instructions on an assignment, use a progress chart, group the class, allow pupils to leave seats without permission, order the pupils, ignore or interrupt, call on non-volunteers, or use drill. These teachers exhibited ambivalent behaviors in that we found both verbal praise and support accompanied by warnings, threats, sarcasm and discourtesy.

Gains in Arithmetic Concepts were denoted by positive loadings on the TOPS factors two, five, nine, ten, sixteen and eighteen. Negative loadings were observed for factors four, seven, thirteen, fifteen, and seventeen. The behaviors that seem related to gain were: calls the pupils honey or other endearing term, demonstrates or uses a visual aid, tells stories, shows affection, places an outline on the board, illustrates at the board, repeats instructions on the assignment, uses a progress chart, comments on homework, uses threats to secure improved pupil performance, orders the pupils, ignores or interrupts the children, calls on non-volunteers,

uses encouraging remarks, stresses form or neatness, keeps a neat desk, uses drill, avoids helping after class and urges completion of a task. We would be less likely to find these behaviors in the ranks of those who obtained better than predicted gain in Arithmetic Concepts: praises pupils of the opposite sex, changes the room between observations, critical behavior, sarcasm, punishment, discourtesy, use of TV or radio, gets the board erased, selects child for special activity, protects the pupil, apologizes, introduces lesson and works around the classroom rather than at the desk. Our more successful teachers were those whose efforts at classroom management and control were embedded in a matrix of warm, verbal support.

Higher than expected gains in Arithmetic Computation were associated with positive loadings on TOPS factors four, ten, twelve, fourteen, fifteen, and nineteen; whereas negative loadings were found for factors five, six, seven, nine, eleven, thirteen, seventeen and eighteen. We would expect to find these behaviors: teacher praises pupil of opposite sex, changes room setting, commands or orders the pupil, ignores or interrupts pupils, calls on non-volunteers, encourages group interaction, allows pupils to speak without permission, restates the question to keep discussion to the point, uses maps or charts, gets the board erased, selects a child for a special activity, protects the pupil, apologizes, asks pupils to help each other, praises pupils of the same sex, is courteous, changes bulletin board, works at desk, urges completion of tasks, and helps pupils after class. We would be less likely to find these behaviors: places outline on the board, illustrates at board, repeats instructions on assignments, uses progress chart, groups the class, allows pupils to leave seats without permission, criticizes pupils of the same sex, uses sarcasm, punishes, comments on homework, uses threats to secure improved pupil performance,

stresses neatness, uses TV or radio, introduces lessons, and uses drill. These teachers tended to combine praise, structure, and group process, while avoiding demeaning behavior and the use of threats.

In summary, it can be seen that each factor from the TOPS was involved in one or more gain scores. Certain behaviors which one might feel on a priori grounds to be less desirable seemed to occur in tandem with other behaviors that possibly acted as "shock absorbers" or as suppressor variables. Factor five (teacher places outline on the board, illustrates at board, repeats instructions on assignments, and uses progress chart) was negatively weighted in gains in two areas of arithmetic but positively weighted in another area of arithmetic. This same factor appeared ambiguously in the two reading gains. The other eighteen factors appeared in gain scores as <u>both</u> positively and negatively weighted. This suggests that no one of these groups of behaviors can be recommended or deprecated, since each seemed to appear as a positive weight in one gain score or another. It should also be noted here that this somewhat "atomic" analysis of specific teacher behaviors fails to take into account the joint covariance interrelationships which were presented in the canonical analyses. The justification for this latter analysis lies in the possibility of clarifying the question of which teacher behaviors are more or less effective. As discussed above, the question cannot be answered from the present data.

<u>Predicting Teacher Behavior from the EPPS</u>

Our discussion to this point has indicated that what the teachers did or did not do in their classrooms affected the amount of gain obtained by their pupils. A next point is simply this, "To what extent can classroom behavior be predicted from a teacher's scores upon the Edwards Personal Preference Schedule (EPPS)?" To shed additional light on this matter, the

canonical correlations reported in Chapter eight were examined to determine which ones predicted factors involving various combinations of the TOPS. The results appear in Table 11.2, "Canonical Correlations Involving TOPS Factors from the EPPS Analyses."

Table 11.2

Canonical Correlations Involving TOPS

Factors, from the EPPS Analyses

TOPS Factor	Canonical Correlation in Which the TOPS Appeared*				
1	none				
2	-8	-9			
3	3	7	10		
4	1				
5	-8				
6	3	-6			
7	-2	-3	-4	-5	10
8	-1	2	-4	-9	
9	1	6	7	8	
10	-2	4	-6	8	10
11	-7	-9			
12	4	8			
13	4				
14	1	5	7		
15	7	-8	-10		
16	10				
17	-5				
18	-4	6			
19	2	9			

* The sign shows the weighting that the TOPS carried in each canonical correlation.

The table shows that TOPS factor one, "Classroom management," was not included in any of the ten canonical correlations. The table also shows that TOPS factor two, "Warm, verbal support," appeared in canonical correlations eight and nine, and that the weight assigned to the factor was negative in both cases. We see that TOPS factors seven, eight, nine, and ten were included in four or five canonical correlations each. These factors were, respectively, Critical punishment vs. courtesy; Ambivalence; Concern with pupil achievement; and Dominance without concern for feelings. It can be seen that these four TOPS factors were related in several ways to the EPPS scales. The other TOPS factors were related to one or more EPPS canonical factors. Careful examination of the EPPS vs. TOPS data shows that no one set of EPPS scores can be regarded as being "favorable" or "unfavorable". Each set of EPPS scores must be considered as a factor in its own right, a factor which predicts a certain group of TOPS factors or TOPS scores. Thus, the canonical correlation number one reported earlier between EPPS and TOPS included no less than seven EPPS scores and four TOPS factors. The point seems to be clear that a simple, one-to-one interpretation of an EPPS score is not currently available.

Table 11.3 discloses the two factor structures yielded by the TOPS, one from the analysis of TOPS and adjusted pupil gain, and the other from the analysis of TOPS and EPPS.

Table 11.3

Teacher Behavior Factors From Two Canonical Analyses:

TOPS - Gain, and TOPS - EPPS

TOPS - Gain

Number of Canonical Correlation

		TOPS Factors				
1.	+	1	3	4	13	
	-	15	17			
2.	+	2	8	11	16	
	-	4	6			
3.	+	7	8	11	13	17
	-	10	12			
4.	+	4	7	8	12	15
	-	6	8	18		
5.	+	12	14	19		
	-	6	8	18		

TOPS - EPPS

Number of Canonical Correlation

		TOPS Factors			
1.	+	4	9		
	-	8	14		
2.	+	8	19		
	-	7	10		
3.	+	3	6		
	-	7			
4.	+	10	12	13	
	-	7	8	18	
5.	+	14			
	-	7	17		
6.	+	9	18		
	-	6	10		
7.	+	3	9	14	15
	-	11			
8.	+	9	10	12	
	-	2	5	15	
9.	+	19			
	-	2	8	4	
10.	+	3	7	10	16
	-	15			

The table shows that some of the teacher behaviors tended to form clusters under both analyses that possessed points in common, but these factors do not appear to be identities. That is, different clusters of teacher behaviors emerged from the two analyses. The closest similarity lies between TOPS - Gain cluster number three and TOPS - EPPS cluster number four. These clusters include four identical elements of teacher behavior, namely those subsumed in TOPS factors seven, eight, ten, twelve and thirteen. Because of the sign reversal in TOPS factor thirteen, it really doesn't fit into this common factor. The behaviors common to the two factors include those of the teacher <u>using</u>: sarcasm, criticism, punishment, discourtesy, accepting hostility, warning or threatening, giving in to pupil demands, admitting errors, commanding, ignoring, calling on non-volunteers, encouraging interaction, allowing pupils to speak without permission, and restating a problem to keep the discussion to the point. These behaviors, plus others indicated in the table, were involved with pupil gains in Arithmetic Reasoning (+.94) and negative weights for Arithmetic Concepts (-.97) and Arithmetic Computation (-.47) and the EPPS scales of Deference (+.71), Succorance (-.60), Abasement (-.32), and Heterosexuality (+.42). This is as close as our data came to finding communalities between GAIN, TOPS, and EPPS. We must conclude, therefore, that although the EPPS did predict our teachers' classroom behavior, the relation between predicted behavior and subsequent pupil gain was far from clear.

<u>Predicting Pupil Gain from the Teachers' EPPS</u>

The analysis presented in Chapter nine shows that five canonical correlations related EPPS scores to various patterns of adjusted gain scores. As we discuss these findings, it may be well to review our

definition of "adjusted gain." It should be recalled that adjusted gain was the difference between a class mean in achievement from the spring (or post-test) and the mean that had been predicted for that class. Thus, an adjusted mean gain of zero indicated that the class reached the predicted mean; a negative score showed that the class fell short of our prediction, and a positive score showed that the class exceeded our prediction. With this in mind, let's look again at some of the data presented in Chapter nine.

The first canonical correlation between adjusted gain and EPPS was equal to 0.75; this included Reading Comprehension, Reading Vocabulary, and Arithmetic Concepts as a gain factor, and the five EPPS needs of Intraception, Succorance, Abasement, Nurturance, and Heterosexuality. Let us assume that the canonical coefficients are actually beta weights. In this case, we can write the equation relating EPPS needs and adjusted gains as follows:

$$.54 \text{ Int} + .72 \text{ Suc} + .63 \text{ Aba} + .41 \text{ Het} - .55 \text{ Nur} = .35 \text{ RV} - .32 \text{ RC} - 1.14 \text{ ACon}$$

In other words, as the four positively loaded needs <u>increase</u>, the expected gain in Reading Vocabulary (RV) would increase and the gain in Reading Comprehension (RC) and Arithmetic Concepts (ACon) would approach zero (which is equivalent to saying that the class made the gain as predicted) or, could become negative. We can rewrite this equation and change the signs in order to see more clearly the consequences of changes in the needs scores:

$$.55 \text{ Nur} - .54 \text{ Int} - .72 \text{ Suc} - .63 \text{ Aba} - .41 \text{ Het} = 1.14 \text{ ACon} + .32 \text{ RC} - .35 \text{ RV}$$

In this case, as the need for nurturance increases and as the needs for intraception, succorance, abasement, and heterosexuality decrease, then

the gains should increase in Arithmetic Concepts and Reading Comprehension, but decrease in Reading Vocabulary. The gain in Reading Vocabulary could, of course, approach zero, which would indicate that the class reached its predicted level. Since the weights in the two equations are approximately equal, we can simplify the expression to:

Nur - Int - Suc - Aba - Het = 2 ACon + RC - RV

So, high scores in nurturance, accompanied by low scores in intraception, succorance, abasement, and heterosexuality should be associated with gains in Arithmetic Concepts and Reading Comprehension, with either zero or negative gains in Reading Vocabulary.

Similar equations can be prepared to account for canonical correlation number two, which was equal to 0.58 and included Reading Comprehension (-.44), Arithmetic Reasoning (-.77), and Arithmetic Concepts (.31) for the gain factor and the EPPS needs of achievement (.56), deference (.73), affiliation (.42), nurturance (.40), change (.34), heterosexuality (.85), and consistency (.72). For clarity, we'll simply use weights of one or two, as follows:

Ach + 2 Def + Aff + Nur + Chg + 2 Het + 2 Con =

ACon - RC - 2 AR

Again, we can see that as scores on the seven EPPS needs increase, we would expect to find increases in adjusted gain in Arithmetic Concepts, but both Reading Comprehension and Arithmetic Reasoning would either decrease or approach zero. If the EPPS scores became negative, then we would anticipate finding higher gains in both Reading Comprehension and Arithmetic Reasoning, with losses in Arithmetic Concepts.

This analysis has served to show again that the relations between our sets of variables were complex rather than simple, that no one score,

or even set of scores, could be viewed apart from the total data. In this study, it was found that personality scores acted with other personality scores, much as has been found in the extensive work reported with the projective tests, especially the Rorschach ink blot test.

The Factors of Adjusted Gain

The canonical analyses of the EPPS and gain and the TOPS and gain yielded several different factors of gain scores. These factors are reported in Table 11.4.

Table 11.4

Canonical Gain Factors from the EPPS and TOPS

Analyses*

Gain Factors from EPPS	Gain Factors from TOPS
I. RV - RC - 3ACon	1. AR - 2RC
II. ACon - RC - 2AR	2. RC + ACon + 2AR - 2RV
III. 2RC - 2RV - AComp	3. 2AR - 2ACon - AComp
IV. RC + RV - 2 AR	4. RC + AComp - ACon - 2RV
	5. AComp + RV + AR - RC

* Weights are approximate.

RV = Reading Vocabulary; RC = Reading Comprehension;

AR = Arithmetic Reasoning; ACon = Arithmetic Concepts;

AComp = Arithmetic Computation

The table shows that the gains factors were not the same for the two analyses, yet possessed certain elements in common. In both analyses, gain in Reading Comprehension was not usually accompanied by comparable gain in Reading Vocabulary, despite the zero order correlation of .75 between the two variables. It would appear that the canonical loadings selected those teachers who tended to achieve at a higher level in one than the other. The Reading Comprehension - Reading Vocabulary reversal is noted in Table 11.4 in factors I, III, 2, and 4. In factors IV and 5, we see that the two gains tended to change together; their weights had the sign.

Gains in arithmetic showed the same sort of disparity, e.g., Arithmetic Concepts was signed differently from Arithmetic Reasoning in factors II and 3, but carried the same signs in factor 2.

These findings need additional study. It is entirely likely that the patterns of gain would have been more consistent had a wider range of criteria for gain been employed. That is, rather than the narrow definition of gain used in this study, one would be well advised to broaden the definition to include other cognate areas such as English, science, social studies, and the like. One might also include variables from the affective domain, factors such as sociometric status, degree of cooperation, leadership, etc. This approach might help to clarify the nature of pupil gain, and by inference, the nature of teaching. It seems quite possible that there are those who excel in teaching the complex areas requiring higher levels of abstraction. And there are likely to be those whose forte is in teaching the rote work. If so, we might be able to justify the use of departmental practices on a more rational basis than hitherto-fore.

12. Summary and Conclusions

This study examined the relationships between adjusted pupil gain, teachers' classroom behavior, and teachers' personality. A volunteer sample of sixty elementary fourth grade teachers was obtained representing sixteen schools in the middle and upper middle class section of a large city in the Southwest.

Design

Adjusted pupil gain was defined as the scores obtained for each teacher for each of five sub-tests from the Blue Level, Forms C and D of the Science Research Associates Achievement Tests, Reading Comprehension, Reading Vocabulary, Arithmetic Reasoning, Arithmetic Concepts, and Arithmetic Computation (Thorpe, et al, 1964). The tests were given in the fall of 1966 and repeated four months later. Regression equations for the total sample were computed; from these, five predicted spring means were determined for each teacher. The predicted mean score was subtracted from the mean score actually obtained in the spring (post-) testing. The differences between predicted and obtained values were the adjusted gain scores.

Teachers' classroom behavior was that behavior exhibited by the teacher during nine observations conducted during the fall of 1966 by a team of three trained observers. A Medley-Mitzel (1959) type of observation schedule was designed for this purpose; the Teacher Observation Personality Schedule (TOPS) was built according to Edwards' definitions of his needs for achievement, abasement, affiliation, dominance, change, orderliness, and heterosexuality. These needs had been found in an earlier study (1964) to be somehow related to pupil achievement.

Teacher personality was defined as the teachers' scores on the sixteen scales of the Edwards Personal Preference Schedule (EPPS - 1959), including the "consistency" score.

The Data

For each teacher, three sets of variables were obtained. We had sixty scores from the TOPS, sixteen scores from the EPPS, and five gain scores. These scores were transformed into either "z" or "T" scores in order to normalize them. The sixty obervation scores were factor analyzed; nineteen factors were obtained, accounting for eighty percent of the variance. Each teacher was then given nineteen factor scores from our records of classroom observations. The three sets of data were then analyzed by The University of New Mexico's IBM computer 360, with program "BMD06M-Canonical Analysis-Version of April 10, 1964, Health Science Facility, UCLA." Each of the three canonical analyses showed that relations did exist between our three sets of variables.

Teacher Behavior (TOPS) and Pupil Gain

Five canonical correlations were computed, ranging from 0.74 to 0.48. Each involved unique elements of both pupil gain and teacher behavior. The correlations and their associated canonical coefficients (much like the weights in factor analysis or the beta weights in multiple regression) are reported below.

<u>Canonical 1 = 0.74</u>

Gain: Reading Comprehension = -1.34 Arithmetic Reasoning = .51

TOPS Factors:

1. Classroom management = .41
3. Warm, physical support = .34
4. Change room; praise pupil opposite sex = .48
13. Use TV; do not change bulletin board = .37
15. Group maintenance = -.37
17. Businesslike management of learning = -.47

Teachers who tended to obtain higher gains (higher than predicted) in Arithmetic Reasoning, but not in Reading Comprehension: asked for good conduct, touched pupils, used TV, changed the room setting, left the bulletin board alone, worked at their desks, responded to pupil calls for assistance, and urged pupils to complete tasks. These teachers tended <u>not</u> to: have pupils keep clear desks, get the chalk board erased, protect pupils, apologize, or introduce lessons.

<u>Canonical 2 = 0.70</u>

Gain: Reading Comprehension = .54 Reading Vocabulary = -1.04

Arithmetic Reasoning = .78 Arithmetic Concepts = .48

TOPS Factors:

4. Changes room; praises pupil of opposite sex = -.36
6. Group process orientation = -.35
2. Warm, verbal support = .30
8. Ambivalence = .33
11. Neatness = .33
16. Encourages neat work = .32

Teachers who obtained higher gains in Reading Comprehension, Arithmetic Reasoning, and Arithmetic Concepts, but not in Reading Vocabulary were likely to: give warm verbal support by calling pupils honey or dear, tell a story, use a visual aid, show affection, accept pupil hostility, warn or threaten, give in to pupil demands, admit mistakes, be neat, stress form and neatness; this group was <u>less</u> likely to: change the room, praise pupils of the opposite sex, group the class, and allow pupils to leave seats without permission.

<u>Canonical 3 = 0.63</u>

Gain: Arithmetic Reasoning = .94 Arithmetic Concepts = .97

Arithmetic Computation = -.47

(This pattern of pupil achievement, obviously, involved only the quantitative aspects of learning.)

TOPS Factors:

7. Critical punishment vs. courtesy = .60
8. Ambivalence = .33
11. Neatness = .41
13. Use TV; don't change bulletin board = .43
17. Businesslike management = .47
10. Dominance without concern for pupils' feelings = -.36
12. Group discussion orientation = -.40

Teachers who were successful in effecting growth in Arithmetic Reasoning were less effective in Arithmetic Concepts and Arithmetic Computation. The teacher behaviors associated with this pattern of pupil achievement were those of: criticism, sarcasm, warning and threatening, punishing, accepting pupil hostility, giving in to pupil demands, admitting mistakes, neatness, using television, and introducing lessons. Less likely

to appear were the behaviors of: courtesy, changing the bulletin board, urging pupils to complete their tasks, working at the desk, commanding or ordering, interrupting, calling upon non-volunteers, encouraging group interaction, permitting pupils to speak without permission, and restating a problem in order to keep a discussion to the point. Not a very "friendly" classroom, one would suspect.

Canonical 4 = 0.54

Gain: Reading Comprehension = .51 Arithmetic Computation = .60

Reading Vocabulary = -1.07 Arithmetic Concepts = -.32

TOPS Factors:

4. Change the room and praise pupils of opposite sex = .43
7. Critical punishment vs. courtesy = .33
8. Ambivalence = .41
12. Group discussion orientation = .31
15. Group maintenance = .33
5. Organized preparation = -.37
6. Group process orientation = -.31
9. Concern with pupil achievement = -.66
18. Drill, unwilling to help outside of classroom = -.34

This pattern of pupil achievement included higher than expected gains in Reading Comprehension and Arithmetic Computation, but lower gains in Reading Vocabulary and Arithmetic Concepts. These gains were obtained by teachers who exhibited the following behaviors: changes the room between observations, praises pupils of the opposite sex, criticizes the pupils, uses sarcasm, punishes, accepts hostility, warns, gives in to pupil demands, admits mistakes, encourages group interaction, allows pupils to speak without permission, restates the problem in order to keep the discussion

to the point, gets the board erased, selects child for special activity, protects pupils, apologizes, and is willing to assist pupils after school. We would be less likely to find teachers: placing outlines on the board, illustrating at the board, repeating instructions on assignments, using progress charts, grouping the class, allowing pupils to leave their seats without permission, commenting on homework, using threats to secure improved performance, or being polite.

Canonical 5 = 0.48

Gain: Reading Comprehension = -.41 Arithmetic Computation = .72

Reading Vocabulary = .61 Arithmetic Reasoning = .37

TOPS Factors:

12. Group discussion orientation = .48
14. Teacher illustrates with map or chart = .49
19. Group approach to pupils of same sex = .66
5. Organized preparation = -.32
8. Ambivalence = -.49
18. Teacher uses drill, but is unwilling to help after class = -.30

Our final canonical analysis combined above-expected gains in Reading Vocabulary, Arithmetic Computation, and Arithmetic Reasoning with lower gains in Reading Comprehension. Behaviors of teachers who produced this pattern included: encourages group interaction, allows pupils to speak without permission, restates problem to keep discussion to the point, illustrates with map or chart, asks pupils to help each other, praises pupils of same sex, and shows willingness to help after class. Behaviors less characteristic of this group of teachers were: interacts with pupils of the opposite sex, uses drill, places an outline on the board, illustrates at the board, repeats instructions on assignment, uses progress chart,

accepts hostility, warns or threatens, gives in to pupil demands, and admits mistakes.

The foregoing analysis showed that no single teacher behavior was detrimental or favorable for all learning. The threats, the punishments, the sarcasm, all had positive effects in one way or another. It should be noted that each of the behavior patterns described above could be reversed in order to account for the achievement gains that carried the negative weights. It would appear that the old adage holds here as elsewhere, "Every dog has his day."

Predicting Teacher Behavior from the EPPS

The nineteen factor scores from the TOPS and the sixteen scores from the EPPS were canonically correlated. Thirteen coefficients were obtained, ranging from 0.87 to 0.30. The discussion which follows reviews only those ten coefficients which were greater than 0.40.

Canonical 1 = 0.87

EPPS: Deference = .41 Abasement = -.41 Aggression = -.54
Heterosexuality = -.43 Nurturance = -.89 Endurance = -.98
Intraception = -.41

TOPS Factors:

4. Changes room and praises pupils of opposite sex = .56
8. Ambivalence = -.45
9. Concern with pupil achievement = .34
14. Uses maps and charts = -.35

Canonical 2 = 0.85

EPPS: Orderliness = -.86 Nurturance = -.59 Heterosexuality = -.47

Change = -.41 Aggression = -.37

TOPS Factors:

7. Critical punishment vs. courtesy = -.42

8. Ambivalence = .76

10. Dominance without concern for feelings = -.41

19. Group approach to pupils of same sex = .44

Canonical 3 = 0.76

EPPS: Achievement = .48 Heterosexuality = .46 Aggression = -.42

Exhibitionism = -.48 Consistency = -.53

TOPS Factors:

3. Warm, physical support = .59

6. Group process orientation = .34

7. Critical punishment vs. courtesy = -.61

Canonical 4 = 0.71

EPPS: Abasement = -.32 Deference = .71 Succorance = -.60

Heterosexuality = .42

TOPS Factors:

7. Critical punishment vs. courtesy = -.38

8. Ambivalence = -.32

10. Dominance without concern for feelings = .32

12. Group discussion orientation = .37

13. Uses TV, but doesn't change bulletin board = .70

18. Drill; doesn't help after class = -.55

Canonical 5 = 0.70

EPPS: Antonomy = -.54 Abasement = -.45 Affiliation = .68

Endurance = -.34 Intraception = -.43 Succorance = -.58

TOPS Factors:

7. Critical punishment vs. courtesy = -.47

14. Uses maps and charts = .39

17. Businesslike management of learning = -.58

Canonical 6 = 0.63

EPPS: Aggression = -.62 Abasement = -.94 Change = -.72

Consistency = -.42 Orderliness = -.59 Heterosexuality = -.66

TOPS Factors:

6. Group process orientation = -.39

9. Concern with pupil achievement = .45

10. Dominance without concern for pupil feelings = -.62

18. Drill; doesn't help after class = .43

Canonical 7 = 0.60

EPPS: Aggression = .69 Intraception = .40 Heterosexuality = .44

Succorance = .42

TOPS Factors:

3. Warm, physical support = .34

9. Concern with pupil achievement = .38

11. Neatness = -.55

14. Use maps or charts = .48

15. Group maintenance = .36

Canonical 8 = 0.56

EPPS: Achievement = .34 Aggression = -.62 Consistency = .35

Dominance = .37 Endurance = -.47 Nurturance = .44

TOPS Factors:

2. Warm, verbal support = -.51

5. Organized preparation = -.48

9. Concern with pupil achievement = .48

10. Dominance without regard for feelings = .36

12. Group discussion orientation = .40

15. Group maintenance = -.46

Canonical 9 = 0.51

EPPS: Autonomy = -.62 Consistency = .44 Endurance = .38

Nurturance = -.89 Orderliness = -.45

TOPS Factors:

2. Warm, verbal support = -.86

8. Ambivalence = -.36

11. Neatness = -.30

19. Group approach to pupils of same sex = .33

Canonical 10 = 0.47

EPPS: Dominance = -.37 Exhibitionism = .44 Heterosexuality = -.33

Intraception = .38 Orderliness = .40

TOPS Factors:

3. Warm, physical support = .51

7. Critical punishment vs. courtesy = .36

10. Dominance without feeling for others = .46

15. Group maintenance = -.56

16. Encourages neat work = .38

The ten canonical correlations, their factors and factor loadings show that the EPPS scores did, in fact, establish a basis for predicting teachers' observed classroom behavior. It would have been very helpful had the pattern of predicted behaviors followed those revealed as contributing to pupil gains, but unfortunately, this was not the case. That is, we found no one-to-one relationships between behavior predicted by the EPPS and behavior found associated with patterns of pupil gain. Part of the problem evidently lies in the nature of canonical analysis: we are not yet familiar enough with the technique to select those results which are more salient than others. And further, the canonical approach furnished us with an unexpected riches of relationships; complex relationships that have not been systematically studied in the past. The results of this portion of the analyses are reminiscent of the complex interrelationships of data produced by projective tests like the Rorschach.

Relations Between Teachers' EPPS Scores and Adjusted Pupil Gain

For each of our sixty teachers, sixteen EPPS and five adjusted pupil gain scores were determined. These scores were transformed into "T" scores in order to normalize them. These transformed scores were subjected to canonical correlation analysis in order to ascertain the relationships between teachers' EPPS patterns and pupil achievement. As indicated below, certain EPPS profiles were associated with greater or lesser degrees of pupil achievement. The five canonical correlations ranged from 0.75 to 0.30; only the highest four correlations were interpreted.

Canonical 1 = 0.75

Gain: Reading Comprehension = -.32 Reading Vocabulary = .35

Arithmetic Concepts = -1.14

EPPS: Abasement = .63 Intraception = .54 Nurturance = -.55

Heterosexuality = .41 Succorance = .72

By reversing the signs of the weights, we can see that maximum gains in Reading Comprehension and Arithmetic Concepts, with lesser gains in Reading Vocabulary were obtained by teachers whose EPPS scores were high in Nurturance, and low in Abasement, Intraception, Heterosexuality, and Succorance. These teachers might be expected to show affection for others and to help others; they would be less likely to: feel timid in the presence of superiors, accept blame when things go wrong, analyze motives, enjoy participating with members of the opposite sex, or receive affection from others.

Canonical 2 = 0.58

Gain: Reading Comprehension = -.44 Arithmetic Concepts = .31

Arithmetic Reasoning = -.77

EPPS: Achievement = .56 Affiliation = .42 Change = .34

Consistency = .72 Deference = .73 Heterosexuality = .85

Nurturance = .40

Again, we reverse the signs in order to interpret as gains the two components--Reading Comprehension and Arithmetic Reasoning; this causes Arithmetic Concepts to take a negative weight. This pattern of pupil achievement was obtained by teachers who scored low in the seven EPPS scales given above. Such teachers would be less inclined toward: doing a difficult job well, sharing with friends, trying new ideas, answering the EPPS in a consistent manner, getting ideas from others, enjoying

participating with members of the opposite sex, and showing affection for others.

Canonical 3 = 0.50

Gain: Reading Comprehension = 1.01 Reading Vocabulary = -1.20
Arithmetic Computation = -.51

EPPS: Achievement = -.35 Aggression = -.48 Dominance = -.34
Endurance = .48 Exhibitionism = .44 Intraception = -.73
Nurturance = .31

Our gain factor included Reading Comprehension opposed to gains in both Reading Vocabulary and Arithmetic Computation. The personality characteristics of teachers effecting this pattern of gains would tend to include: perseverance, enjoys being the center of attention, desires to help others, and show affection for them. This group would be less likely to exhibit: willingness to do a difficult job well, criticize openly, be a leader, or analyze the motives of others.

Canonical 4 = 0.46

Gain: Reading Comprehension = .57 Reading Vocabulary = .66
Arithmetic Reasoning = -1.06

EPPS: Autonomy = -.58 Consistency = .45 Deference = -.32
Intraception = -.40 Nurturance = -.91 Succorance = -.33

This canonical correlation extracts a gain factor somewhat at variance with the gain factor from correlation three. In the case of three, Reading Comprehension and Reading Vocabulary were heavily weighted in opposite directions. In the present gain factor, we see that the two are weighted in the same direction--but are opposed to gain in Arithmetic Reasoning. The personal traits associated with this pattern of gain included a higher

score on consistency; these teachers would be less inclined toward: independence in thought and action, getting suggestions from others, analyzing motives, helping others, or receiving affection from others.

Discussion of the Four Canonical Correlational Analyses

The maximum amount of gain was apparently obtained by those teachers who tended to score low in the EPPS scales of Abasement, Autonomy, Affiliation, Change, Deference, Exhibitionism, Endurance, Heterosexuality, and Succorance. Higher scores were obtained in the needs for Aggression and Dominance. Four scales were not clear. Low scores in the need for Achievement were related to gains in Reading Comprehension and Arithmetic Reasoning, but lower gains in Arithmetic Concepts (canonical 2). Intraception was weighted negatively in canonicals one and four, but plus in number three. The need for Nurturance was positively weighted in canonical correlation one, but negatively in two, three, and four. Consistency was inconsistent with a plus weight in number four, but negative in two. The need for Orderliness was not involved in any of these analyses.

From an EPPS point of view, the more effective teachers may be described as critical, willing to accept leadership, and interested in persuading and influencing others. These more effective teachers were less likely to: feel timid in the presence of superiors, be independent, try new ideas, get suggestions from others, avoid the unconventional, be the center of attention, show perseverance, enjoy participating with members of the opposite sex, and receive affection from others.

Some General Observations

First and foremost, this study has validated the Medley-Mitzel model for studying teacher effectiveness. Their postulated three major linkages:

Teacher personality causes teacher behavior causes pupil behavior have been supported. But, as noted several times in our exposition, the linkages are not one-to-one; they are complex relations. Our data showed that teachers' classroom behavior is related to adjusted pupil gain. The Edwards Personal Preference Schedule was found to be related to our teachers' classroom behaviors, but not in a manner that enabled us to directly predict those behaviors found related to above-average pupil gain. The EPPS also provided profiles of a sort that identified those teachers who were more likely to effect higher gains than predicted from their pupils' fall test means.

Several questions remain. First, the use of canonical correlation seemed to shed new light upon the complex problems at hand. The technique is relatively new to the educational scene; increased familiarity with its use should simplify or clarify the problem of interpreting fully the factorial structures which result.

In this connection, one might also examine the particular set of criterion variables selected for this study. We used five adjusted gain scores from the SRA Achievement Tests: Reading Comprehension, Reading Vocabulary, Arithmetic Reasoning, Arithmetic Concepts, and Arithmetic Computation. This choice materially reduced the kinds of adjusted gain factors that could emerge from the canonical analyses. Other researchers might be well advised to increase these variables, both in the cognate areas and in the affective domain. It seems quite possible that the factorial structures would be less ambiguous, and consequently, more understandable. The two sets of analyses involving adjusted gain scores suggested the possibility that teacher effectiveness was partially related to the nature of the instruction or the kind of gain. That is, it may be that certain teachers are more effective with the basic fundamentals

which stress memory and the like. Others might be more effective in teaching the complex relationships as in comprehension and understanding. This whole area of the nature of teaching/learning needs to be clarified.

Along similar lines, we often wondered about the validity of our measuring instruments: did the SRA tests really measure the kinds of things for which our sample of fourth grade teachers was striving? We need methodological studies aimed at clarifying the nature of the commonly used standardized achievement tests. If it happens that most test items fall into Bloom's (1956) level one, acquisition of facts, then this would severely curtail investigations of teaching where teachers were attempting to get across the more complex elements of their subjects. In other words, it may be that the tests measure the "wrong" things.

Another source of difficulty lies in the sample which was selected. As mentioned earlier, this was a volunteer sample drawn from middle and upper middle class schools. Our study of the status-quo merely reflected current practice and current behavior. One might repeat this study, with modifications, in schools from different socio-economic levels or different cultural groups. Perhaps the teacher behaviors which were found to be effective in teaching comprehension might not hold for a different kind of social class.

Still another promising line of research would be that of experimentally manipulating certain of the behaviors which we found to be more effective for certain kinds of pupil gains. For example, we noted that higher gains in Reading Comprehension accompanied by lower gains in Arithmetic Reasoning were associated with the following teacher behaviors: introduces lesson, moves about the room, gets board erased, selects child for special project, protects pupils, apologizes, changes bulletin board, and insists that desks be kept clear. These teachers were less likely to: ask for good conduct,

speak over pupil noise, respond at once to calls for help, touch pupils, work with individuals, praise pupils of the opposite sex, change the room between observations, and make use of television. One could design a brief unit, even a micro unit, and have certain of these behaviors manipulated. That is, several teachers would apply the behaviors which we think were effective, and others would apply their reverse. The subsequent effects upon pupil gain could be verified.

The relationships of the Edwards Personal Preference Schedule to teacher behavior needs to be examined more closely. According to Edwards, his need for nurturance, for example, identifies those who show affection for others and who like or want to help others. One might hypothesize that this need would appear in most of the analyses of pupil gain, since helping pupils seems to be involved in teaching. But, this failed to predict gain with any degree of consistency. Other EPPS scores could be investigated in much the same manner. The consequences might be in two dimensions: a validation of the EPPS in the classroom situation; a revision of current thinking about desirable characteristics of effective teachers.

In summary, we are suggesting that this study be repeated in schools which reflect a different socio-ethnic level than the white middle class, that work be done on standardized achievement tests in order to clarify what it is that they measure, and that certain behaviors which we found related to pupil gain be experimentally studied in order to establish cause and effect relationships.

APPENDIX A

TOPS Items

ITEM		
1	a1	Teacher urges, stresses completion of task
2	a2	Teacher repeats lesson, instructions on assignment
3	a3	Teacher groups class
4	a4	Teacher uses drill
5	a5	Teacher uses encouraging remarks, praise, reward
6	a6	Teacher uses threat to secure improved pupil performance
7	a7	Teacher comments on homework
8	Xa1	Teacher uses progress chart
9	b1	Teacher apologizes
10	b2	Teacher admits mistake
11	b3	Teacher gives in to pupil demands or compromises with pupils
12	b4	Teacher accepts hostility, objections from pupils
13	b5	Teacher allows pupils to speak without permission
14	b6	Teacher allows pupils to leave seats without permission
15	b7	Teacher asks for good conduct, cooperation from pupils
16	b8	Teacher speaks over pupil noise
17	c1	Teacher uses television, radio
18	c2	Teacher lectures, reads, tells story
19	c3	Teacher illustrates at board
20	c4	Teacher illustrates at map, chart
21	c5	Teacher demonstrates, uses visual aids
22	c6	Teacher shows film, slides, plays records
23	c7	Teacher works at desk
24	c8	Teacher changes from individual to group, v.v.
25	Xc1	Teacher changes bulletin board between observations
26	Xc2	Teacher changes room set between observations
27	d1	Teacher warns pupil
28	Xd1	Teacher commands, orders, directs pupil
29	d2	Teacher punishes pupil
30	d3	Teacher calls on non-volunteer
31	d4	Teacher restates problem to keep discussion to point
32	d5	Teacher selects child or group for special act
33	d6	Teacher ignores, interrupts pupil answer or question
34	f1	Teacher works with individual pupil
35	f2	Teacher encourages pupil-group-class interaction
36	f3	Teacher asks pupils to help each other
37	f4	Teacher shows affection for pupil
38	f5	Teacher is polite, courteous to pupil
39	f6	Teacher is willing to help pupil after class
40	f7	Teacher protects pupil
41	f8	Pupil asks for help and teacher helps immediately
42	o1	Teacher places outline, questions on board
43	o2	Teacher insists pupils desks clear except for pertinent material
44	o3	Teacher introduces lesson
45	o4	Teacher gets board erased
46	o5	Teacher stresses form, neat work
47	o6	Teacher straightens desks, blinds, curtains

APPENDIX A (continued)

ITEM		
48	Xo1	Visual aids neat and organized
49	Xo2	Teacher's desk is neat and orderly
50	h1	Teacher calls, talks, interacts with pupil of opposite sex
51	h2	Teacher praises pupil of opposite sex
52	h3	Teacher calls pupil of opposite sex honey, dear, etc.
53	h4	Teacher touches pupil of opposite sex
54	h5	Teacher warns, threatens, punishes pupil of opposite sex
55	h6	Teacher calls talks, interacts with pupil of same sex
56	h7	Teacher praises pupil of same sex
57	h8	Teacher calls pupil of same sex honey, dear, etc.
58	h9	Teacher touches pupil of same sex
59	h0	Teacher criticizes or corrects pupil of same sex
60	Xd2	Teacher uses sarcasm

APPENDIX B

Manifest Needs Associated with
EDWARDS PERSONAL PREFERENCE SCHEDULE VARIABLES (1959)

1. ach Achievement: To do one's best, to be successful, to accomplish tasks requiring skill and effort, to be a recognized authority, to accomplish something of great significance, to do a difficult job well, to solve difficult problems and puzzles, to be able to do things better than others, to write a great novel or play.

2. def Deference: To get suggestions from others, to find out what others think, to follow instructions and do what is expected, to praise others, to tell others that they have done a good job, to accept the leadership of others, to read about great men, to conform to custom and avoid the unconventional, to let others make decisions.

3. ord Order: To have written work neat and organized, to make plans before starting on a difficult task, to have things organized, to keep things neat and orderly, to make advance plans when taking a trip, to organize details of work, to keep letters and files according to some system, to have meals organized and a definite time for eating, to have things arranged so that they run smoothly without change.

4. exh Exhibition: To say witty and clever things, to tell amusing jokes and stories, to talk about personal adventures and experiences, to have others notice and comment upon one's appearance, to say things just to see what effect it will have on others, to talk about personal achievements, to be the center of attention, to use words that others do not know the meaning of, to ask questions others cannot answer.

5. aut Autonomy: To be able to come and go as desired, to say what one thinks about things, to be independent of others in making decisions, to feel free to do what one wants, to do things that are unconventional, to avoid situations where one is expected to conform, to do things without regard to what others may think, to criticize those in positions of authority, to avoid responsibilities and obligations.

6. aff Affiliation: To be loyal to friends, to participate in friendly groups, to do things for friends, to form new friendships, to make as many friends as possible, to share things with friends, to do things with friends rather than alone, to form strong attachments, to write letters to friends.

7. int Intraception: To analyze one's motives and feelings, to observe others, to understand how others feel about problems, to put one's self in another's place, to judge people by why they do things rather than by what they do, to analyze the behavior of others, to analyze the motives of others, to predict how others will act.

8. suc Succorance: To have others provide help when in trouble, to seek encouragement from others, to have others be kindly, to have others be sympathetic and understanding about personal problems,

APPENDIX B (continued)

to receive a great deal of affection from others, to have others do favors cheerfully, to be helped by others when depressed, to have others feel sorry when one is sick, to have a fuss made over one when hurt.

9. dom Dominance: To argue for one's point of view, to be a leader in groups to which one belongs, to be regarded by others as a leader, to be elected or appointed chairman of committees, to make group decisions, to settle arguments and disputes between others, to persuade and influence others to do what one wants, to supervise and direct the actions of others, to tell others how to do their jobs.

10. aba Abasement: To feel guilty when one does something wrong, to cept blame when things do not go right, to feel that personal pain and misery suffered does more good than harm, to feel the need for punishment for wrong doing, to feel better when giving in and avoiding a fight than when having one's own way, to feel the need for confession of errors, to feel depressed by inability to handle situations, to feel timid in the presence of superiors, to feel inferior to others in most respects.

11. nur Nurturance: To help friends when they are in trouble, to assist others less fortunate, to treat others with kindness and sympathy, to forgive others, to do small favors for others, to be generous with others, to sympathize with others who are hurt or sick, to show a great deal of affection toward others, to have others confide in one about personal problems.

12. chg Change: To do new and different things, to travel, to meet new people, to experience novelty and change in daily routine, to experiment and try new things, to eat in new and different places, to try new and different jobs, to move about the country and live in different places, to participate in new fads and fashions.

13. end Endurance: To keep at a job until it is finished, to complete any job undertaken, to work hard at a task, to keep at a puzzle or problem until it is solved, to work at a single job before taking on others, to stay up late working in order to get a job done, to put in long hours of work without distraction, to stick at a problem even though it may seem as if no progress is being made, to avoid being interrupted while at work.

14. het Heterosexuality: To go out with members of the opposite sex, to engage in social activities with the opposite sex, to be in love with someone of the opposite sex, to kiss those of the opposite sex, to be regarded as physically attractive by those of the opposite sex, to participate in discussions about sex, to read books and plays involving sex, to listen to or to tell jokes involving sex, to become sexually excited.

APPENDIX B (continued)

15. agg Aggression: To attack contrary points of view, to tell others what one thinks about them, to criticize others publicly, to make fun of others, to tell others off when disagreeing with them, to get revenge for insults, to become angry, to blame others when things go wrong, to read newspaper accounts of violence.

16. con Consistency: Scores on the consistency variable are based upon a comparison of the number of identical choices made in two sets of the same fifteen items. If we take the two appearances of one of these items, the possible patterns of response are AB, BA, AA, and BB. If the subject is responding to the items by chance alone, each of these possible patterns of response is equally likely. The probability, therefore, of any one of these patterns occurring by chance is one-fourth. Either AA or BB, however, would be counted as an identical choice. Therefore, the probability of an identical choice is equal to one-fourth plus one-fourth or one-half. For the two complete sets of fifteen items, the expected number of identical choices, i.e., the consistency score, on the basis of chance, is 7.5.

The probability of nine or more identical choices occurring by chance is approximately .30. The probability of ten or more identical choices occurring by chance is approximately .15, and the probability of eleven or more identical choices occurring by chance is approximately .06. Eleven or more identical choices may be taken as a significant departure from chance expectancy. Thus, if the consistency score for a subject is eleven or higher, we may regard this as evidence that the subject is not making his choices on the basis of chance alone. A more lenient standard would be ten or more identical choices for which the probability is about .15.

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